2010 FRUITLAND OUTCROP MONITORING REPORT

LA PLATA COUNTY COLORADO

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Prepared for:

THE GROUP
Durango, Colorado

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Prepared for:

THE GROUP
Durango, Colorado

Prepared by:

LT ENVIRONMENTAL, INC.
Four Corners Office
2243 Main Avenue, Suite 3
Durango, Colorado 81301
(970) 385-1093

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EXECUTIVE SUMMARY

This Fruitland Formation (Kf) Outcrop Monitoring Report has been prepared on behalf of Chevron Corporation (Chevron), BP, Inc. (BP), XTO Energy, Inc. (XTO), the Colorado Oil and Gas Conservation Commission (COGCC), the Bureau of Land Management (BLM), and La Plata County. These organizations are collectively referred to as "The Group". The Kf outcrop monitoring is conducted in order to comply with COGCC Orders 112-156 and 112-157.

The 2010 methane seep survey was performed from June 14, 2010 through August 9, 2010. The surveys was conducted at four key areas (divided into seven sub-areas) of interest along the Kf outcrop in La Plata County north of the Southern Ute Indian Tribe (SUIT) Reservation boundary, plus three additional abandoned/shut-in well locations. The 2010 survey area included 959 acres of the Kf outcrop.

A total estimated methane volumetric flux rate for mapped areas, utilizing only those values that were greater than the 0.2 moles per meter squared per day ($mol/m^2 \cdot day$) instrument reporting limit was 1,748 thousand cubic feet per day (MCFD), down from 6,099 MCFD in 2007. The mitigation systems at the South Fork Texas Creek (SFTC) and Pine River mapping area remove approximately 8 MCFD of methane from the seep areas.

The total estimated carbon dioxide volumetric flux rate for mapped areas was 1,229 MCFD. Hydrogen sulfide flux values along the Kf outcrop continue to remain very low and most measured values were reported only slightly above the detection limit of the flux meter.

Four natural springs were sampled in June 2010. The dissolved methane concentrations in all natural spring water samples were below the 2 milligram per liter (mg/L) COGCC threshold to identify water for further investigation of the origin of the methane in the water.

At the request of the COGCC, flux measurements were collected at the areas surrounding abandoned production wells Baird #1-25 (API #05-067-06568) and Federal #34-1/2-34-1 (API #05-067-07514) and shut-in production well Pole Barn Monitor Well #1 (API #05-067-07969). Methane was not detected at any of the abandoned/shut-in production well locations above the flux meter reporting limit.

Based on the results of the 2010 Kf outcrop monitoring event, LTE recommends the following:

- Conduct detailed methane seep mapping and flux estimation using the portable flux meter in June 2011. LTE will return to the sample locations visited during the 2010 field activities;
- Sample natural springs every year to assess any changes in the flow rates, and/or the chemistry of natural springs. The next natural spring sampling event will be the spring of 2011; and
- Conduct the next regional reconnaissance infrared imagery (IR) aerial survey in 2011, which will include the Horse Gulch mapping area, to confirm any changes to the methane seepage along the Kf outcrop in La Plata County.

SECTION 1.0

INTRODUCTION

This Fruitland Formation (Kf) Outcrop Monitoring Report has been prepared on behalf of Chevron Corporation (Chevron), BP, Inc. (BP), XTO Energy, Inc. (XTO), the Colorado Oil and Gas Conservation Commission (COGCC), the Bureau of Land Management (BLM), and La Plata County. These organizations are collectively referred to as "The Group".

Since 1997, LT Environmental, Inc. (LTE) has conducted methane seep monitoring along the Kf outcrop in La Plata County, Colorado (Figure 1). The project area is located along the north rim of the San Juan Basin, north of the Southern Ute Indian Tribe (SUIT) Reservation boundary. The Kf outcrop monitoring is conducted in order to comply with COGCC Orders 112-156 and 112-157.

1.1 OBJECTIVE

The objective of the methane seep monitoring program is to observe and document the relative change in methane seepage from the Kf outcrop over time and space. In total, the scope of work provides an efficient and repeatable means to characterize subsurface gas seepage, if any, in the project area by inspecting those areas with the greatest potential for seeps based on geological characteristics and historical field observations.

1.2 PROJECT AREA

The project area consists of approximately 23 miles of the Kf outcrop extending from the northern boundary of the SUIT Reservation near Basin Creek (southwest of Durango), northeastward to the boundary between La Plata and Archuleta Counties (Figure 1).

1.3 BACKGROUND INFORMATION

There have been a number of previous and continuing studies, which support the overall methane seepage evaluation. Some of these studies include:

- Detailed mapping, methane seepage data collection, and mitigation in the Pine River area by BP between 1994 and 2004;
- A reconnaissance survey by Stonebrooke in 1995, on behalf of several oil and gas operators and with the assistance of the BLM. The survey consisted of over 1,100 surface and subsurface methane sample points. This survey identified four additional primary methane gas seepage areas besides Pine River, including Basin Creek, Carbon Junction, Florida River, and South Fork Texas Creek (SFTC);
- Installation of 162 permanent soil gas monitoring probes by LTE in 1997, with additional probes installed at various locations since 1997, and ongoing monitoring of the points by the BLM. The probes are sampled by the BLM approximately six times per year;

- Installation of six flux chambers in the primary seep areas and periodic monitoring of the flux chambers from 1998 to 2005. The flux chambers measured gas flow on 10-minute intervals and have since been removed;
- Annual pedestrian reconnaissance surveys of the Kf outcrop by LTE from 1998 through 2001;
- Flux chamber system modifications, detailed seep mapping, and an infrared imagery (IR) pilot study performed in August 2002. The pilot study demonstrated that IR imagery is useful in identifying suspect areas based on stressed vegetation, which can be subsequently field verified for the presence or absence of methane;
- Detailed methane seep mapping in the known seep areas in October 2002, May 2003, May 2004, June 2005, May 2006, September 2007, June through September 2008, and; June through September 2009;
- Regional reconnaissance of the 23-mile section of the Kf outcrop in the project area in July 2003, September 2005, and October 2008. The regional reconnaissance included the collection of infrared imagery, identification of suspect areas, and field verification;
- Natural springs surveys along the 23-mile outcrop in La Plata County, north of the SUIT Reservation boundary, in September 2005, May 2006, October 2007, June and October 2008, and May and October 2009;
- Private Airborne Natural Gas Emission Lidar (ANGEL) data acquisition by ITT Corporation (ITT) during the summer of 2008;
- Installation of methane mitigation systems in SFTC and Pine River 2009; and
- Expansion of the SFTC methane mitigation systems during June 2010.

1.4 SCOPE OF WORK

The scope of work for the 2010 methane seep monitoring included the following tasks:

1) Obtaining permission to access private properties;
2) Conduct detailed seep mapping at four key areas of interest;
3) Conduct detailed seep mapping at three abandoned/shut-in production well locations;
4) Monitor natural springs; and
5) Preparing this report.

1.5 ORGANIZATION OF THE REPORT

This report is organized into seven sections, including this introduction (Section 1.0), which presents the objectives of the study and discusses background information related to the project. The field methods and equipment are described in Section 2.0. The results of the detailed flux mapping are summarized in Section 3.0. The natural springs monitoring results are presented in

Section 4.0. The results of the abandoned/shut-in wells flux mapping are presented in Section 5.0. The summary, conclusions, and recommendations of this survey are presented in Section 6.0. The report references are listed in Section 7.0. Tables, figures, and appendices follow the text in separate sections.

SECTION 2.0

FIELD METHODS

2.1 PROPERTY ACCESS

Prior to conducting 2010 field activities, LTE acquired landowner information from the La Plata County Assessor's Office. LTE cross-referenced parcel data and the Kf outcrop geometry to identify owners of parcels located on the Kf outcrop. Much of the Kf outcrop is on federal land with unrestricted access. LTE attempted to contact private landowners along the Kf outcrop in La Plata County. LTE was denied access to several properties; as a result, no investigation activities were conducted on these properties during the 2010 monitoring event. The 2010 status of property access is presented in Table 1.

2.2 PROJECT AREA

LTE conducted detailed flux surveys at the following four areas of interest along the Kf outcrop in La Plata County (Figure 1):

- Basin Creek to Carbon Junction;
- Florida River;
- Vosburg Pike; and
- SFTC to Pine River.

During previous years, detailed survey efforts for these four areas of interest were further divided into seven geographical areas: Basin Creek (subdivided into Basin Creek and Basin Creek North); Carbon Junction; Florida River; Vosburg Pike; SFTC (subdivided into West, Central, and East); BP Highlands; and Pine River. To standardize the flux comparison process from year to year, these seven geographical areas are grouped according to location along the Kf outcrop. Notable observations and field results within the seven subdivided areas are discussed below.

The Horse Gulch area was not mapped in 2010. This area was excluded in 2009 and 2010 due to the very low or absent methane values detected during the comprehensive survey of the Horse Gulch area in 2008. Horse Gulch has not exhibited methane seepage during previous regional reconnaissance and pedestrian survey monitoring events conducted since 1997. The Horse Gulch area will be reviewed in 2011 during the regional reconnaissance with IR imagery and field verification.

2.3 DETAILED MAPPING

The grids for detailed mapping areas consisted of a varying number of squares, ranging in area from 2,500 square feet (ft^2) to 40,000 ft^2. In general, 50-foot and 200-foot grid spacings were used, depending on site-specific needs. The smaller grid spacing was used to map the relatively

small known methane seep areas. The grid mapping system has proven to be systematic, consistent, repeatable, and successful in delineating the lateral extent of seepage.

LTE collected a flux measurement at the corner of each grid square. When methane was detected along the outer edges of the mapping area, additional grid points were developed and measured to determine the extent of methane seepage.

Full-color spectrum aerial photographs used as base maps for field use and figures for this report are dated 2009 and do not necessarily indicate present surface conditions. The geologic contacts depicted on the aerial photographic maps were derived from geologic maps prepared by the Colorado Geological Survey (CGS) and digitized at a scale of 1:25,000. Accuracy of the formation contact is reduced when aerial photographs are viewed at a smaller scale.

The flux of soil gases moving across the soil surface to the atmosphere were measured using a West Systems, LLC (West Systems) portable gas flux meter. The flux meter has been used to measure soil gas seepage on the Kf outcrop since 2007. The meter measures the flux of methane, hydrogen sulfide, and carbon dioxide by employing individual gas-specific sensors that record the increases, if any, of gas concentrations over time for a given surface area. These increases in concentration over time are proportional to the flux of each gas measured. A brief description of the flux meter is summarized below. Information on the West Systems portable gas flux meter is provided in Appendix A.

The flux meter components include an accumulation chamber connected by circulation tubes to the gas detector unit. At each sampling point, the accumulation chamber was placed on the ground surface to capture gas seeping from the ground. Captured gases are continuously mixed by a small fan within the accumulation chamber during the measurement process. A pump moves the gases in the accumulation chamber to the detector unit. After passing through the detector unit, gases are returned to the chamber. This closed loop process allows soil gases discharging to the chamber to increase over time. Any increases in concentrations are measured and recorded automatically. No gas is allowed to escape the system; however, a vacuum is not created during the process. This enables the measurement of natural seep conditions, if present. The result for each gas is reported as a mass flux in units of moles per square meter per day (moles/m^2·day).

Flux measurement accuracy can be limited by surface conditions. One of the most important factors is the quality of the seal between the accumulation chamber base and the ground surface. To ensure a proper seal between the ground surface and the chamber, LTE personnel chose relatively flat surfaces where possible and placed loose soil around the base of the chamber to reduce the potential for gas loss at the base of the chamber. In addition, LTE attempted to minimize ground disturbance during the measurement process in order to maintain the natural seep conditions. In areas with heterogeneous surfaces, the seal was sometimes difficult to achieve. This scenario was evident at locations with poorly developed soil or where the soil surface was obscured by decayed organic matter on the forest floor.

The accuracy of the total flux estimation within the project area is influenced by the ability of the grid spacing system to represent the actual flux on a detailed level relative to the subsurface

fracture system, coal quality, and stratigraphy within the Kf. The accuracy of the field meters also influences the flux estimation.

The methane sensor within the flux meter unit has a range of 60 parts per million (ppm) to 50,000 ppm. The flux meter methane measurement range is 0.2 to 300 moles/m^2·day. Methane flux values below 0.2 moles/m^2·day are detectable and reported, although with decreased accuracy. Due to the low accuracy and confidence level of methane flux values below 0.2 moles/m^2·day, the reporting limit set for the flux meter is 0.2 moles/m^2·day. As a result, reporting of methane flux values did not include values below the reporting limit and were not included in methane flux contours or in the calculation of total methane flux volumes. Supporting flux data are included in Appendix B.

The carbon dioxide sensor has a full-scale range of 0 ppm to 20,000 ppm and a flux measurement range of 0 to 600 moles/m^2·day at an accuracy of ±25 percent (%).

The hydrogen sulfide detector has a full-scale range of 0 ppm to 20 ppm and a flux measurement range of 0.0025 to 0.5 moles/m^2·day at an accuracy of ±25%. The sensor is an electrochemical cell that measures hydrogen sulfide through a chemical oxidation process. The sensing process consumes a small amount of the hydrogen sulfide, which is not returned to the flux meter's accumulation chamber. Therefore, the flux meter can underestimate hydrogen sulfide flux by as much as 10%.

During the measurement process, gas concentrations were recorded at one-second intervals and directly downloaded via a Bluetooth® connection to a portable digital assistant (PDA) integrated with the Trimble GeoXT® global positioning system (GPS) unit (described below). Other measurements recorded included barometric pressure, temperature, date, and time.

Integrated West Systems Flux Manager® software on the GPS unit recorded the gas measurement data. The software plotted the curve of gas concentration versus time for each measurement collected. LTE selected the best-fit line for the curve generated. The slope of the best-fit line is proportional to the flux at the measurement point.

2.4 GLOBAL POSITIONING SYSTEM DATA MANAGEMENT

Each sample location was recorded using a GPS unit. Soil gas sampling grids were created in ArcView® and pre-loaded into the GPS unit so field personnel could quickly and accurately position detection equipment along the project area. Soil gas measurements and other relevant field data were then stored as attributes in the GPS unit along with the associated location data. The data stored in the GPS unit were later downloaded for processing and reporting.

The GPS unit location data were collected in the World Geodetic System 1984 (WGS 84) and projected in Colorado State Plane South (feet), North American Datum 1983 (NAD 83) for use in an ArcView® project file. On average, 25 GPS log positions were collected for each point feature in order to obtain more accurate positioning.

Readings collected with the GPS unit can be located with one-meter accuracy; however, the terrain along the Kf outcrop can adversely affect GPS unit accuracy. North-facing slopes and heavily wooded areas can distort or block satellite signals. When satellite signals are limited,

positioning accuracy decreases. In locations where the GPS unit could not obtain a signal, LTE field personnel noted measurement data on their field reference maps. Specifications of the GPS unit are included in Appendix A.

2.5 NATURAL SPRINGS MONITORING

At each sampled natural spring, LTE personnel collected water samples and monitored for subsurface soil gases near the springs using the portable flux meter. LTE personnel located the position and elevation using the GPS at each natural spring. A water discharge rate was measured using a graduated cylinder and stopwatch. Water quality measurements, including pH, electrical conductivity (EC), and temperature were collected at each sampled natural spring.

Laboratory analytical water samples were collected at each accessible and flowing natural spring in bottles and containers prepared by the subcontracted analytical laboratories. Each sample bottle was labeled, indicating the project and sample identification, and the date and time of sample collection. Samples were delivered directly or shipped to the laboratories under chain-of-custody controls.

In 2010, natural spring water samples were collected and submitted to Four Corners Geoscience, Inc. for analysis of dissolved methane. General water chemistry samples were submitted to Green Analytical Laboratories.

2.6 ABANDONED/SHUT-IN PRODUCTION WELL FLUX MAPPING

At the request of the COGCC, flux measurements were collected at areas surrounding abandoned production wells Baird #1-25 (API #05-067-06568) and Federal #34-1/2-34-1 (API #05-067-07514) and shut-in production well Pole Barn Monitor Well #1 (API #05-067-07969).

LTE mapped the collected methane flux points next to each abandoned/shut-in production well utilizing the flux meter. If methane was detected in soil, the seep area was then delineated in all four directions.

SECTION 3.0

DETAILED MAPPING RESULTS

This section describes the results of the detailed flux mapping conducted from June 14, 2010 through August 9, 2010 in the four main mapping areas. Previous soil gas mapping events were conducted in October 2002, May 2003, May 2004, June 2005, May/June 2006, September 2007, June through September 2008, and June through September 2009. Events through 2006 were conducted exclusively using the multi-gas meter. Beginning in 2007, the flux meter was utilized to conduct detailed soil gas mapping. A total of 1,204 flux measurements were collected over 959 acres of land in the project area during the 2010 event.

Methane and carbon dioxide flux measurements are summarized by Kf outcrop areas of interest in Table 2. Methane and carbon dioxide measurements are presented on Figures 2 through 21. Flux data are included as Appendix B.

LTE has reported flux measurements in this document as mass flux with the units of moles/m^2·day. Conversion to volumetric flux rates in units of thousand cubic feet per day (MCFD) has been provided as a reference for the natural gas production industry, which typically uses volumetric flow rates. The conversion of mass flux units to volumetric flux is discussed in Section 3.4, with calculation details provided in Appendix C.

3.1 OVERALL METHANE RESULTS

The 2010 monitoring event resulted in methane flux above the reportable limit (0.2 moles/m^2·day) was recorded at 84 of the 1,204 (7%) sample locations. Detectable methane flux were recorded at 248 of the 1,204 (20.6%) sample locations. The detected methane flux values of each measured location area for the entire project area ranged from 0.002 moles/m^2·day to a maximum of 216.7 moles/m^2·day. Methane flux results for each location of interest are discussed in Section 3.5.

3.2 OVERALL CARBON DIOXIDE RESULTS

The 2010 monitoring event detected carbon dioxide flux at 1,045 of the 1,204 (86.8%) sample locations. The carbon dioxide flux values of each measured location area for the entire project area ranged from 0.0007 moles/m^2·day to a maximum 5.32 moles/m^2·day throughout the entire project area. Carbon dioxide flux results for each location of interest are discussed in Section 3.5.

3.3 OVERALL HYDROGEN SULFIDE RESULTS

Hydrogen sulfide flux (though barely above sensor detection limits) was recorded at 832 sample locations. The flux meter is a highly sensitive field meter capable of detecting very low flux rates of hydrogen sulfide. Thus, it is not surprising that hydrogen sulfide flux was detected at 178 of the sampling points (14.8%) during the 2010 detailed mapping event. However, only 32 points were slightly above the unit's reliable detection limit of 0.0025 moles/m^2·day. Given the flux meter's accuracy of ±25%, the majority of these measured values are not considered to pose a threat to human health.

Elevated levels of hydrogen sulfide have been identified in the Carbon Junction and SFTC areas since the inception of the monitoring program, but concentrations in the atmosphere above the ground surface have not been detected at levels that pose a risk to human health. Elevated hydrogen sulfide concentrations have been detected in the shallow subsurface soil; however, concentrations were found to dissipate quickly to below detectable limits above the ground surface. The source of the hydrogen sulfide detected along the Kf outcrop is believed to be from local, near surface, anaerobic microbial activity, as hydrogen sulfide is not present in the coalbed methane production gas developed within the northern San Juan Basin.

Due to the very low values of hydrogen sulfide measured during the 2010 detailed mapping program, maps of hydrogen sulfide measurements were not deemed useful and therefore, not prepared.

3.4 TOTAL FLUX VOLUME ESTIMATIONS

LTE estimated the total volumetric flux of methane and carbon dioxide by combining generally contiguous areas of interest of the Kf outcrop in La Plata County. Flux data were interpolated and gridded and then contoured and processed to estimate the total volumetric flux rates.

The results were converted to volumetric flux rates common to the natural gas production industry in units of MCFD. For a better perspective of the methane flux and carbon dioxide flux rates, LTE converted the mass flux values into volumetric flux units of cubic feet per day (CFD), assuming equal areas. The unit conversion is based on the molecular weight of the gas and the density of the gas at approximately 7,000 feet above mean sea level. For methane flux, the calculation is as follows:

$$\frac{\text{mol } CH_4}{\text{day}} \times \frac{16.04276 \text{ g } CH_4}{\text{mol } CH_4} \times \frac{0.0698 \text{ ft}^3 CH_4}{\text{g } CH_4} = \frac{\text{ft}^3 CH_4}{\text{day}}$$

For example,

$$1.0 \text{ mole/day } CH_4 = 1.12 \text{ CFD } CH_4$$

For carbon dioxide flux, the calculation is as follows:

$$\frac{\text{mol } CO_2}{\text{day}} \times \frac{44.01 \text{ g } CO_2}{\text{mol } CO_2} \times \frac{0.0253 \text{ ft}^3 CO_2}{\text{g } CO_2} = \frac{\text{ft}^3 CO_2}{\text{day}}$$

For example,

$$1.0 \text{ mole/day } CO_2 = 1.11 \text{ CFD } CO_2$$

Notes:

CH4 – methane
Ft3 – cubic feet
g – grams
CO2 – carbon dioxide

The volumetric flux values calculated herein are estimates and may not represent actual values for the specific areas. Interpolation calculation techniques are highly sensitive to data skewness and can result in large changes in calculated flux values based on measurements made at only a few locations. Methane flux volumes were calculated using values that were at or above the reporting limit as described in Section 2.3. A discussion of the methods and calculations used to determine total methane flux is presented in Appendix C.

The total estimated methane volumetric flux rate for the mapped areas on the Kf outcrop in La Plata County utilizing all methane flux values was 1,776 MCFD. A total estimated methane flux volume utilizing only those values that above the reporting limit was 1,748 MCFD.

The total estimated carbon dioxide volumetric flux rate for the mapped areas on the Kf outcrop in La Plata County was 1,229 MCFD.

Table 3 summarizes the total flux volumes for each mapping area and includes historical comparisons.

3.5 SPECIFIC PROJECT AREA RESULTS

3.5.1 Basin Creek to Carbon Junction

The Basin Creek and Carbon Junction survey areas are located just south of the city of Durango and consist of approximately 6.9 miles of the Kf outcrop. A summary of the 465 flux measurements is presented in Table 2.

The detailed flux mapping of the Basin Creek area was conducted between June 17, 2010 and June 25, 2010. The mapping area was centered on Basin Creek just east of the recently constructed Animas-La Plata Basin Ridges dam. Figures 2 through 5 illustrate methane and carbon dioxide flux results of the detailed mapping in the Basin Creek area.

The Carbon Junction area was mapped between June 14, 2010 and June 15, 2010. The mapping area at Carbon Junction is centered on the Animas River near the Wal-Mart shopping center on Highway 160. Figures 6 and 7 illustrate methane and carbon dioxide flux results of the detailed mapping in the Carbon Junction area, respectively.

The Basin Creek to Carbon Junction survey area has an estimated methane seepage area of 110 acres with a total reportable volumetric flux rate of 293 MCFD. Carbon dioxide was mapped over approximately 415 acres with a total volumetric flux rate of 458 MCFD.

3.5.2 Florida River

The survey area at Florida River extended approximately 1.5 miles along the Kf outcrop. The Florida River mapping was conducted between June 25, 2010 and June 26, 2010. A total of 65 flux sample points were measured. The Florida River mapping area has an estimated methane seepage area of 26 acres with a total reportable volumetric flux of 154 MCFD. Carbon dioxide seepage area is approximately 61 acres with a total volumetric flux of 90 MCFD.

A summary of the flux measurements is presented in Table 2. Figures 8 and 9 illustrate the methane and carbon dioxide flux results of the Florida River area, respectively.

3.5.3 Vosburg Pike

The mapping area at Vosburg Pike is an upland portion of the Kf outcrop, located approximately halfway between the Florida River and SFTC mapping areas. The Vosburg Pike mapping area covered approximately 1.3 miles along the Kf outcrop. Flux mapping occurred on August 4, 2010 through August 9, 2010.

A total of 74 flux sample points were measured. The Vosburg Pike mapping area has an estimated methane seepage area of 23 acres with a total reportable volumetric flux rate of 1 MCFD. Carbon dioxide was mapped over approximately 74 acres with a total volumetric flux rate of 132 MCFD.

A summary of the flux measurements is presented in Table 2. Figures 10 and 11 illustrate the methane and carbon dioxide flux results for the Vosburg Pike area, respectively.

3.5.4 Texas Creek to Pine River

The Texas Creek to Pine River mapping area consists of 5 individual areas including Texas Creek West, Texas Creek Central, Texas Creek West, BP Highlands, and Pine River. The entire mapping area is approximately 4.4 miles of the Kf outcrop. A summary of the 526 flux measurements is presented in Table 2.

The survey area collectively known as SFTC (Texas Creek West, Texas Creek Central, and Texas Creek East) is located where the creek transects the Kf outcrop (Figures 12 through 21). A large alluvial grass-covered valley parallels the strike of the outcrop but eventually turns northward and transects the contact between the Kf and Pictured Cliffs Formation (Kpc). The main seep area within SFTC and the Ward and Kurtz properties has been designated SFTC Central (Figures 14 and 15). The seep area located approximately 0.25 miles east of the creek has been labeled SFTC East (Figures 16 and 17). Areas west of the creek are designated Texas Creek West (Figures 12 and 13).

The seep at SFTC is considered to be one of the most active methane seeps within the project area and is currently undergoing a pilot study funded by the COGCC to evaluate mitigation technologies for methane seepage. A decrease of methane seepage in 2010 in the SFTC Central area appears to be the result of a newly installed mitigation system. The system was expanded from June 14 to June 24, 2010. The 2010 flux survey at SFTC occurred between June 28, 2010 and August 4, 2010. The initial startup data from the mitigation system indicated the flow rate of the methane gas used by the system is approximately 8 MCFD under normal conditions. Methane flux was recorded around the perimeter of the system in 2010 near the edges of the collection system. Following system expansion in 2010, the volume of gas captured exceeds the volume of gas used by the turbine driven electrical generator, resulting in the observed gas seepage at the collection system boundary.

The BP Highlands is an upland area west of Pine River (Figures 18 and 19). Over the last several years, the previous property owner had noted an increase in areas of dead vegetation and had

also complained about methane in their water supply wells, which are completed in the Kf. The flux survey within the BP Highlands area was between July 7, 2010 and July 14, 2010.

The mapping area at Pine River is located where the Pine River transects the Kf outcrop. The 2010 survey event occurred between July 10, 2010 and July 12, 2010. The seep at Pine River is also currently undergoing a pilot study funded by the COGCC to evaluate mitigation technologies for the methane seepage. As with the SFTC Central area, the Pine River area appears to be positively influenced by the mitigation system due to the decrease in methane flux values measured during the 2010 monitoring survey. According to data, the flow rate of methane that is recovered from the mitigation system is approximately 12 MCFD. Figures 20 and 21 illustrate the methane and carbon dioxide flux results for the survey performed at Pine River, respectively. The location of the mitigation system is illustrated in both figures.

The Texas Creek to Pine River survey area has an estimated methane seepage area of 160 acres with a total reportable volumetric flux rate of 1,300 MCFD. Carbon dioxide was mapped over approximately 441 acres with a total volumetric flux rate of 546 MCFD.

3.6 HISTORICAL FLUX DATA COMPARISON

From 2007 to 2008, LTE expanded the detailed survey area from 554 acres to 1,951 acres, roughly 3.5 times the area of the previous survey. The increase in survey area was due largely to the addition of the Horse Gulch mapping area. However, in 2008 very little seepage was measured in the Horse Gulch area; therefore it was not considered an active seep area. As a result, the 2009 and 2010 surveys excluded the Horse Gulch area. The 2010 survey area included 959 acres of the Kf outcrop. Figure 22 illustrates an overlay of survey areas mapped from 2007 through 2010.

In 2007, LTE estimated the total methane flux over the accessible Kf outcrop in La Plata County north of the SUIT boundary at 6,120 MCFD. Results of the 2008 survey estimated a total volumetric methane flux of 5,170 MCFD, while the results of the 2009 survey estimated a total volumetric methane flux of 4,150 MCFD. The results of the 2010 survey estimated a total volumetric methane flux of 1,776 MCFD. Total reportable flux volumes over the project area have decreased from 2007 (6,099 MCFD) to 2010 (1,748 MCFD).

While the survey area increased by nearly 3.5 times in acreage between 2007 and 2008, the total volumetric methane flux decreased. Total volumetric methane flux from 2007 to 2010 appears to have decreased, inferring that the methane seep along the Kf Outcrop in La Plata County has contracted.

In general, decreases in methane flux from 2007 to 2010 were noted in the Basin Creek to Carbon Junction area and the SFTC sub-area. Fluctuations of methane flux have been observed in the Florida River and Vosberg Pike areas and in the BP Highlands and Pine River sub-areas during the past four years.

Table 3 summarizes the changes in the seepage extent and the volumetric methane flux from 2007 through 2010. Figures 23 and 24 depict methane seepage extent compared to survey area from 2007 through 2010, respectively. In order to compare methane fluxes for each year, the figures depict reportable methane flux measurements. This visual representation of methane flux

is able to show areas of significant methane seepage throughout the Kf outcrop and an understanding as to why these specific areas are investigated. Visual comparison shows the decrease in reported methane flux along the Kf outcrop.

SECTION 4.0

NATURAL SPRINGS MONITORING

Nine natural springs have been previously identified on the Kf outcrop in La Plata County north of the SUIT boundary. Due to access restrictions, the following six natural springs were accessible in 2010:

- Darwin Rather Spring #1;
- Darwin Rather Spring #2;
- Hoier Spring;
- Rancho Durango LTD Spring;
- Rancho Durango East Spring; and
- Rancho Durango North Spring.

The locations of natural springs are presented on Figures 25 through 27. A summary of natural springs sampled in 2010, along with past natural springs sampling status, is presented in Table 4.

4.1 FIELD OBSERVATIONS

Discharge rates were measured at two natural springs and field parameters were measured at four natural springs sampled in June 2010. The remaining two natural springs were either a bog with no water flow or the spring pipe was cut during monitoring well installation. As a result, field parameters and water samples for analysis were not collected at these locations.

The 2010 field observations and measurements for the six natural springs, including historical measurements, are summarized in Table 5. Figure 28 depicts the Tri-Linear diagram for the four springs sampled. Stiff diagrams, shown on Figure 29, indicate that the water type for each spring sampled is calcium-carbonate.

4.2 NATURAL SPRINGS SAMPLING AND ANALYSIS

The COGCC uses 2 milligrams per liter (mg/L) for dissolved methane in domestic water systems as the threshold to identify water for further investigation of the origin of the methane. The COGCC holds that water systems containing dissolved methane concentrations above 2 mg/L have an increased risk of desorption from the water, creating potentially explosive conditions in confined spaces.

In 2010, methane was detected in one natural spring water sample. Results showed that Rancho Durango LTD Spring had a methane detection limit of 0.1 mg/L. Historically, methane had been detected at Rancho Durango LTD Spring, Darwin Rather Spring #2, and Hoier Spring at concentrations below the 2 mg/L COGCC threshold.

Laboratory analytical results for dissolved methane, including historical results, are summarized in Table 6. Major ion chemistry of the natural spring samples is summarized in Table 7. Analytical results are presented in Appendix D.

4.3 SUBSURFACE SOIL GAS MEASUREMENTS

During the June 2010 natural spring sampling event, one subsurface soil gas measurement was collected at Rancho Durango LTD, Rancho Durango North, Darwin Rather #1, and Darwin Rather #2 springs using traditional subsurface soil-gas sampling techniques and the multi-gas meter. Subsurface methane was not detected in any of the subsurface soil gas probes at the measured natural springs.

SECTION 5.0

ABANDONED/SHUT-IN WELLS FLUX RESULTS

LTE conducted detailed methane, carbon dioxide, and hydrogen sulfide subsurface mapping utilizing the flux meter at two abandoned production gas well sites [Baird #1-25 (API #05-067-06568) and Federal #34-1/2-34-1 (API #05-067-07514)] and one shut-in production well [Pole Barn Monitor Well #1 (API #05-067-07969)] on July 14, 2010. Monitoring was conducted at the request of the COGCC to determine whether methane seepage exists within the vicinity of the sites.

Flux measurements were collected at each location. A total of 22 measurements were collected at Pole Barn Monitor Well #1 (Figure 30); 20 measurements at Federal 34-1/2-34-1 (Figure 31); and, 32 measurements at Baird 1-25 (Figure 32). Methane was not detected at any sample location above the reportable limit.

SECTION 6.0

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

6.1 SUMMARY

The 2010 methane seep survey was performed from June 14, 2010 through August 9, 2010. This was the fourth survey event that the portable flux meter has been used to conduct methane seep mapping. Mapping was performed at four key areas of interest (divided into seven sub-areas) along the Kf outcrop in La Plata County north of the SUIT Reservation boundary, and at three abandoned/shut-in well locations. The detailed flux mapping program included the same areas mapped in 2008 with the exception of the Horse Gulch area. The 2010 survey area included 959 acres of the Kf outcrop.

A total estimated methane volumetric flux rate, for areas mapped along the Kf outcrop in La Plata County utilizing only those values that were greater than the reporting limit was 1,748 MCFD.

The total estimated carbon dioxide volumetric flux rate for those areas mapped along the Kf outcrop in La Plata County was 1,229 MCFD.

Hydrogen sulfide flux values along the Kf outcrop continue to remain very low and most collection points were only slightly above the detection limit of the flux meter.

Four natural springs were sampled in June 2010. The dissolved methane concentrations in three of the four water samples collected during 2010 were below the laboratory method detection limit of 0.02 mg/L and all were below the 2 mg/L COGCC threshold to identify water for further investigation of the origin of the methane.

At the request of the COGCC, flux measurements were collected at the areas surrounding abandoned production wells Baird #1-25 (API #05-067-06568) and Federal #34-1/2-34-1 (API #05-067-07514) and shut-in production well Pole Barn Monitor Well #1 (API #05-067-07969). Methane was not detected at any of the mapping locations above the flux meter reporting limit.

6.2 CONCLUSIONS

Total reportable volumetric flux rates across the project area have decreased from 6,099 MCFD in 2007 to 1,748 MCFD in 2010. The decreasing trend of methane flux in the project area has been observed for the past four years. Expansion of the mitigation systems at the SFTC and Pine River mapping area remove approximately 14.4 to 22.8 MCFD of methane from the seep areas.

Data continues to indicate that hydrogen sulfide is present in the subsurface at measurable levels in only a few locations. Measured values above the ground surface are very low, if not detected, and are not considered to be a threat to human health. The source of the hydrogen sulfide is believed to be local, near surface, anaerobic microbial activity.

6.3 RECOMMENDATIONS

Based on the results of the 2010 Kf outcrop monitoring event, LTE recommends the following:

- Conduct detailed methane seep mapping and flux estimation using the portable flux meter in June 2011. LTE will return to the sample locations visited during the 2010 field activities;

- Sample natural springs every year to assess any changes in the flow rates, and/or the chemistry of natural springs. The next natural spring sampling event will be the spring of 2011; and

- Conduct the next regional reconnaissance IR aerial survey in 2011, which will include the Horse Gulch mapping area, to confirm the presence or absence of methane seepage along the Kf outcrop in La Plata County.

SECTION 7.0

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TABLES

TABLE 1
PROPERTY ACCESS STATUS
2010 FRUITLAND OUTCROP MONITORING
LA PLATA COUNTY, COLORADO

THE GROUP

Parcel Number	Access Granted	Property Owner	Mailing City/State/Zip Code
BASIN CREEK MAPPING AREA			
566907100035	Yes	STATE OF COLORADO, BENEFIT OF DIV OF WILDLIFE	DENVER, CO 80216
566301200139	Yes	USA ACTING THROUGH BUREAU OF RECLAMATION	SALT LAKE CITY, UT 84138
CARBON JUNCTION MAPPING AREA			
566905100002	Yes	CARVON LLC	DURANGO, CO 81301
566905400803 566904200021	Yes	CITY OF DURANGO	DURANGO, CO 81301
566905100028	Yes	DONALD L CARLENO AND MARY ELIZABETH VON FELDT	DURANGO, CO 81301
566905400806 566905400032	No Response	DURANGO CROSSING II LLC, C/O KE ANDREWS & COMPANY	MESQUITE, TX 75187
566904300003	No Response	EMERY WILLMETT ETALS	DURANGO, CO 81301
566905400024	No Response	LA PLATA COUNTY HUMANE SOCIETY	DURANGO, CO 81301
566733100801	No Response	OAK RIDGE ENERGY INC	WICHITA FALLS, TX 76302
566905100003	Yes	STATE OF COLORADO, DEPARTMENT OF TRANSPORTATION	DENVER, CO 80222
566905400805	No Response	WAL MART STORES INC, #DIVISION-STORE PROP TAX #0555	BENTONVILLE, AR 72712
FLORIDA RIVER MAPPING AREA			
566524100806 567118300800	No	MACHO FAMILY TRUST	DURANGO, CO 81301
567119200267	No	MARSHALL A. & MARY P. BEACH TRUSTEES & ZACHARIAH A. BEACH	SANTA FE, NM 87508
567118400806	Yes	PALMER RANCH LIMITED II	DURANGO, CO 81301
567119200197	No	STEPHAN TURNER AND REGINA TURNER-ANDEREGG	DURANGO, CO 81301
566524400813	No Response	SUBSURFACE MACHINE & MFG INC	DURANGO, CO 81301
566524100054	Yes	WILLIAM AND SHERRY LOEHR	OJAI, CA 93023
567119200266	No Response	WILLIAM BUSH AND ELIZABETH W. MARSH	DURANGO, CO 81301
VOSBERG PIKE MAPPING AREA			
567110300889	No Response	BARBARA DILLOW NICHOLS	CAPE CANAVERAL, FL 32920
567111200305	Yes	BLM	
567111300824	No Response	D&G INVESTMENTS	GILBERT, AZ 85297
567109300185	Yes	EL DORADO RANCH	DURANGO, CO 81301
567115200325	Yes	JEAN-PHILIPPE MULA	SEATTLE, WA 98119
567110300887 567110300892	No Response	RISE AND WALK LP	DURANGO, CO 81301
567115200335	No Response	ROBERT M. & RENEE M JT STRONG LIVING TRUST	SAN CLEMENTE, CA 92672
567109100806 567110200805 567110100820	No	SHERWOOD MCGUIGAN	DURANGO, CO 81301
TEXAS CREEK MAPPING AREA			
567508100113 567508100165	Yes	C GLEN & IVY K WALKER	BAYFIELD, CO 81122
567507400270	Yes	DARWIN AND MAXINE RATHER	BASALT, CO 81621
567508400264	No	DENNIS AND DUANE McCOY	DURANGO, CO 81301
567508200327	No	DIANA M WILKENING AND BECKY JO HITCHCOCK	BAYFIELD, CO 81122
567509300144 567508400169	No Response	E WARD PROPERTIES NO 2 LTD, LLP	BAY CITY, TX 77414
567508100168	No	GREGORY R. SARAFIN	DURANGO, CO 81302-2754
567509200167	Yes	H RICHARD KURTZ	BAYFIELD, CO 81122
567509100179	Yes	HARRY DILLASHAW LIVING TRUST	HOUSTON, TX 77001
567508200326	Yes	BRETT CLARK	BAYFIELD, CO 81122
567507100320 567507100319	Yes	JACKIE BERTSCH	SCOTTSDALE, AZ 85255
567112100261	No Response	KANE RANCH LLC	ALBUQUERQUE, NM 87110
567509100178	Yes	KELLY ROBERTS PARTNERSHIP	LAKE JACKSON, TX 77566
567508400192	Yes	LEWIS CHRISTOPHER CHARLSIE AND PAULA LEA NYGUARD	BAY CITY, TX 77414
567507300278	No	MICHAEL DEWITT	BAYFIELD, CO 81122
567508300307	Yes	PHILIP JAMES AND LUCY T BRYSON	BAYFIELD, CO 81122
567509200132 567509200284	Yes	RONALD C. & DARLENE A. FINCHER	BAYFIELD, CO 81122
567508200328	Yes	RONALD L & CHERYL A & JARRETTE IRELAND	BAYFIELD, CO 81122
567509300188 567509400231	No Response	ROY VARCOE & MICHAEL GORETSKI & MARK MARION	COMMERCE TWP, MI 48390
567507100332	No	TOM BUSCAGLIA	DURANGO, CO 81301
567508100265	No Response	VICTORIA ANNE HUYCK & TIMOTHY YALE DEAL	CHERRYHILL, NJ 08034
567508300309 567508300308	Yes	WILLIAM AND ELIZABETH TULLOCH CO TRUSTEES	RAMONA, CA 92065
PINE RIVER MAPPING AREA			
567514201003	Yes	ALAN R. & GAY W. FRIEDMAN	TUCSON, AZ 85705
567515100018	Yes	BLM	
567514201018	No	BRYAN F. & JULIE A. GREEN	ALBUQUERQUE, NM 87114
567514201002	No Response	CARY ALLEN RAY & MITZIE CORBIN	DALLAS, TX 75206
567514300009	Yes	HERMAN SCHUTZ, C/O LA PLATA COUNTY ASSESSORS	DURANGO, CO 81302
567514300016	No Response	GERALD D. & AVON D. MAGEE	BLOOMFIELD, NM 87413
567514201019	No Response	JENNIFER SUE YOUNG	PLACENTIA, CA 92870
567514201009 567514201014	No Response	JOEL AND CORY LYNNE BRAME	WILDWOOD, MO 63005
567514201020	No Response	JOSEPH AND HELEN CALLENDER	METAIRIE, LA 70002
567514201002	Yes	KRISTOPHER GRAHAM	BAYFIELD, CO 81122
567514201015	Yes	OSCAR D. & BETTY PERRY	BAYFIELD, CO 81122
567514100002 567514100015	No Response	REMMOW LAND CO LIMITED PARTNERSHIP	STEAMBOAT SPRINGS, CO 80477
567514400008	No Response	ROBERT H & GWENDOLYN S WILLIAMS TRUSTEES	BAYFIELD, CO 81122
567514201001	No Response	VICKY A MULLINS TRUST	BAYFIELD, CO 81122
567514201017	No Response	WILLIAM EARL GOMER	HERRIMAM, UT 84065
567513300017	Yes	YIANNAKIS LINE LLC	NAPERVILLE, IL 60563
BP HIGHLANDS MAPPING AREA			
567509400065	Yes	RVM LLC	BAYFIELD, CO 81122
EDGEMONT RANCH MAPPING AREA			
567117201011 567117301008 567117301007 567117401004	No	GORTON FAMILY LIMITED PARTNERSHIP LLLP	DURANGO, CO 81301
567117101001	No Response	WILLIAM J. & DONNA M. HERRICK TRUSTEES	CARSLBAD, CA 92011

TABLE 2
FLUX MEASUREMENTS
2010 FRUITLAND OUTCROP MONITORING
LA PLATA COUNTY, COLORADO

THE GROUP

Mapping Area	Total Number of Sample Points	Methane Flux			Carbon Dioxide Flux	
		Number of all Sample Points w/ CH_4	Number of Sample Points w/ CH_4 [1]	Maximum flux value[2]	Number of Sample Points w/ CO_2	Maximum flux value[2]
Basin Creek to Carbon Junction	465	74	24	9.3	382	3.99
Florida River	65	18	5	32.7	56	1.89
Vosburg Pike	74	16	1	0.5	66	2.37
Texas Creek to Pine River	526	136	54	216.7	469	5.32
Federal 34-1/2-34-1	20	0	0	--	19	0.29
Baird 1-25	32	4	0	0.0014	32	0.30
Pole Barn Monitor Well #1	22	0	0	--	21	0.93
Total	**1,204**	**248**	**84**		**1,045**	

Notes:

Flux measurements are in units of moles per square meter per day ($mol/m^2 \cdot day$)

CH_4 - Methane

CO_2 - Carbon dioxide

[1] - Based on methane flux values that are greater than the flux meter reportable limti of 0.2 $mol/m^2 \cdot day$

[2] - Statistics based on non-zero measurements

-- - Indicates value not applicable due to no value greater than 0 0.2 $mol/m^2 \cdot day$

TABLE 3
HISTORICAL METHANE AND CARBON DIOXIDE FLUX COMPARISON
2010 FRUITLAND OUTCROP MONITORING
LA PLATA COUNTY, COLORADO

THE GROUP

Mapping Area	Methane											
	2007			2008			2009			2010		
	Seepage Area (acres)	Total Volumetric Flux (MCFD)	Reportable Volumetric Flux* (MCFD)	Seepage Area (acres)	Total Volumetric Flux (MCFD)	Reportable Volumetric Flux* (MCFD)	Seepage Area (acres)	Total Volumetric Flux (MCFD)	Reportable Volumetric Flux* (MCFD)	Seepage Area (acres)	Total Volumetric Flux (MCFD)	Reportable Volumetric Flux* (MCFD)
Basin Creek to Carbon Junction	94	654	641	406	1,048	967	312	798	760	110	310	293
Florida River	30	135	131	52	44	27	39	626	622	26	156	154
Vosburg Pike	14	6	2	43	22	11	34	19	15	23	10	1
Texas Creek to Pine River	162	5,325	5,325	359	4,056	4,006	259	2,707	2,702	160	1,300	1,300
Federal 34-1/2-34-1	NC	NC	NC	NC	NC	NC	0	0	0	0	0	0
Baird 1-25	NC	NC	NC	NC	NC	NC	1.07	0.03	0	0.67	0.001	0
Pole Barn Monitor Well #1	NC	NC	NC	NC	NC	NC	0	0	0	0	0	0
TOTAL	**300**	**6,120**	**6,099**	**860**	**5,170**	**5,011**	**645**	**4,150**	**4,099**	**320**	**1,776**	**1,748**

Mapping Area	Carbon Dioxide							
	2007		2008		2009		2010	
	Seepage Area (acres)	Volumetric Flux (MCFD)	Seepage Area (acres)	Volumetric Flux (MCFD)	Seepage Area (acres)	Volumetric Flux (MCFD)	Seepage Area (acres)	Volumetric Flux (MCFD)
Basin Creek to Carbon Junction	137	231	582	740	506	747	415	458
Florida River	48	68	61	73	55	119	61	90
Vosburg Pike	28	44	55	52	41	56	74	132
Texas Creek to Pine River	173	715	537	1,161	452	580	441	546
Federal 34-1/2-34-1	NC	NC	NC	NC	3.48	3.1	1.47	0.7
Baird 1-25	NC	NC	NC	NC	3.67	1.4	1.84	1.3
Pole Barn Monitor Well #1	NC	NC	NC	NC	2.42	1.2	1.57	0.7
TOTAL	**386**	**1,058**	**1,235**	**2,026**	**1,064**	**1,508**	**996**	**1,229**

Notes:

MCFD - thousand cubic feet per day

* Reportable methane flux volumes calculated using points greater than 0.2 moles per squared meter per day

NC - Not Calculated

TABLE 4
NATURAL SPRINGS SAMPLING STATUS
2010 FRUITLAND OUTCROP MONITORING
LA PLATA COUNTY, COLORADO

THE GROUP

Natural Spring	2005	2006	2007	2008		2009		2010
				June	November	May	October	
Rancho Durango North Spring	NS	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled
Rancho Durango East Spring	NS	NS	Sampled	NS	Sampled	Dry	Dry	NS
Rancho Durango LTD Spring	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled
Darwin Rather Spring #1	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled
Darwin Rather Spring #2	Sampled	Sampled	NS	Sampled	Sampled	Sampled	Dry	Sampled
Wilbourn Spring #1	NS	NS	NS	NS	NS	No Access	No Access	No Access
Wilbourn Spring #2	NS	NS	NS	NS	NS	No Access	No Access	No Access
Wilbourn Spring #6	NS	NS	NS	NS	NS	No Access	No Access	No Access
Hoier Spring	NS	Sampled	Sampled	Sampled	Sampled	Sampled	Dry	NS

Note:
NS - Not Sampled

TABLE 5
NATURAL SPRINGS FIELD MEASUREMENTS
2010 FRUITLAND OUTCROP MONITORING
LA PLATA COUNTY, COLORADO

THE GROUP

Natural Spring	Date	Temperature (°C)	pH	Electrical Conductivity (µS/cm)	TDS (mg/L)	ORP (mV)	Flow (GPM)	Subsurface Methane (ppm)
Rancho Durango North Spring	5/24/2006	13.4	7.67	533.2	360.7	87	2.0	NM
	10/8/2007	19.2	7.28	514.8	263.9	43	<0.5	NM
	6/23/2008	19	6.93	728	510.8	51	0.38	0
	10/15/2008	11.4	6.9	617	401	112.8	1.5	0
	5/12/2009	9.7	7.1	591	NM	NM	2.82	0
	10/6/2009	12.1	7.25	651	NM	NM	0.6	0
	6/29/2010	13.7	7.03	586	NM	NM	0.6	0
Rancho Durango East Spring	10/15/2008	7.8	6.5	510	0.334	87.2	0.19	0
	5/12/2009	Dry - Not Measured						0
	10/6/2009	Dry - Not Measured						0
	6/29/2010	Bog with no water flow						NM
Rancho Durango LTD Spring	9/14/2005	14.6	8.05	494.1	338.0	66	>1	NM
	5/24/2006	19.3	7.38	524.5	345.9	77	1.5	NM
	10/8/2007	19.0	7.29	499.7	245.8	529	<0.25	NM
	6/23/2008	12.4	8.02	526	376	20	0.48	0
	10/15/2008	12.4	7.4	561	365	126.9	1.5	0
	5/12/2009	10.9	7.36	593	NM	NM	1.47	0
	10/6/2009	7.1	7.25	635	NM	NM	0.4	0
	6/29/2010	13.9	7.05	574	NM	NM	0.49	0
Darwin Rather Spring #1	9/17/2005	10.6	7.20	479.9	329.2	59	0.50	NM
	5/24/2006	12.3	7.76	425.9	288.4	52	1.0	NM
	10/8/2007	15.2	8.05	399.5	210.6	55	1.0	NM
	6/23/2008	12.6	7.34	432.0	308.9	81	NM	0
	10/15/2008	Dry - Not Measured					9	0
	5/12/2009	7.9	7.16	437.0	NM	NM	0.23	0
	10/6/2009	8.4	7.18	475	NM	NM	NM	0
	6/29/2010	11.6	6.72	476	NM	NM	NM	0
Darwin Rather Spring #2	9/17/2005	14.4	7.50	271.4	178.3	45	<0.25	NM
	5/24/2006	13.0	7.69	344	222.9	-62	<1.0	NM
	10/8/2007	Dry - Not Measured						NM
	6/26/2008	18	7.31	261.4	180.5	76	0.63	0
	10/15/2008	10.9	6.9	289	188	3	0.25	0
	5/12/2009	10.5	7.43	270	NM	NM	1.80	0
	10/6/2009	Dry - Not Measured						0
	6/29/2010	21.1	7.58	252	NM	NM	NM	0
Hoier Spring	5/24/2006	17.5	7.24	670.5	453.9	35	NM	NM
	10/8/2007	21.0	8.23	221.6	111.9	20	<0.25	NM
	6/23/2008	20.8	8.2	257.0	173.0	52.0	0.042	NM
	10/15/2008	12.33	7.78	254	165	90.4	0.031	0
	5/14/2009	18.1	6.9	380.0	NM	NM	0.050	0
	10/6/2009	Dry - Not Measured						0
	6/29/2010	Spring pipe cut during monitoring well installation; not enough water to sample						NM

Notes:

°C - degrees Celcius
µS/cm - microSiemens per centimeter
mg/L - milligrams per liter
mV - millivolts
GPM - gallons per minute
ppm - parts per million
TDS - total dissolved solids
ORP - oxidation reduction potential
< - less than
> - greater than
NM - Not Measured

TABLE 6
NATURAL SPRINGS LABORATORY METHANE CONCENTRATIONS
2010 FRUITLAND OUTCROP MONITORING
LA PLATA COUNTY, COLORADO

THE GROUP

Natural Spring	DISSOLVED METHANE (mg/L)							
	2005	2006	2007	2008		2009		2010
	September	May	October	June	October	May	October	June
Rancho Durango North Spring	Not Sampled	<0.0010	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Rancho Durango East Spring	Not Sampled				<0.02	Not Sampled		Not Sampled
Rancho Durango LTD Spring	<0.0005	0.0016	<0.02	<0.02	<0.02	<0.02	<0.02	0.1
Darwin Rather Spring #1	<0.0005	<0.0010	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Darwin Rather Spring #2	0.002	0.0017	Not Sampled	<0.02	<0.02	<0.02	Not Sampled	<0.02
Hoier Spring	Not Sampled	0.0017	<0.02	<0.02	<0.02	<0.02	Not Sampled	Not Sampled

Notes:

mg/L - milligrams per liter

< - less than the stated laboratory method detection limit

TABLE 7
NATURAL SPRINGS MAJOR IONS CONCENTRATIONS
2010 FRUITLAND OUTCROP MONITORING
LA PLATA COUNTY, COLORADO

THE GROUP

Natural Spring	Sample Date	Cations				Anions				TDS (mg/L)
		Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Carbonate (mg/L)	Bicarbonate (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	
Darwin Rather Spring #1	6/23/2008	65.0	21.4	9.0	1.3	<10	212	39	<10	230
	10/15/2008	56.7	18.6	7.5	0.9	<10	208	34	11	230
	5/12/2009	54.7	17.6	7.8	1.1	<10	200	33	10	205
	6/29/2010	59.9	19.6	8.4	1.3	<10	204	44	<10	245
Darwin Rather Spring #2	6/23/2008	39.3	6.1	13.6	<0.5	<10	138	19	<10	130
	10/15/2008	33.7	6.6	10.9	0.5	<10	133	16	<10	170
	5/12/2009	35.3	6.7	11.3	0.8	<10	123	22	<10	150
	6/29/2010	37.9	6.5	11.8	1.3	<10	119	12	<10	140
Rancho Durango LTD Spring	6/23/2008	79.5	20.1	16.7	0.9	<10	252	69	<10	305
	10/15/2008	69.7	17.5	14.9	1.0	<10	252	71	<10	300
	5/12/2009	79.8	19.1	16.4	1.2	<10	258	80	<10	305
	6/29/2010	80.3	18.7	16.9	1.4	<10	250	69	<10	350
Rancho Durango North Spring	6/23/2008	108	31.9	14.5	2.0	<10	332	122	<10	460
	10/15/2008	77.1	22.0	13.7	1.1	<10	276	79	<10	355
	5/12/2009	80.1	19.3	15.5	1.1	<10	262	71	<10	335
	6/29/2010	83.4	19.8	16.8	1.1	<10	252	80	<10	340
Rancho Durango East Spring	10/15/2008	60.5	12.9	14.8	0.7	<10	206	42	<10	250
	5/12/2009	Not Sampled				Not Sampled				Not Sampled
	6/29/2010	Not Sampled				Not Sampled				Not Sampled
Hoier Spring	6/23/2008	25.8	12.4	13.9	1.3	<10	144	<10	<10	105
	10/15/2008	23.7	11.8	13.7	1.4	<10	138	<10	<10	135
	5/14/2009	24.0	11.2	11.9	1.2	<10	133	<10	<10	100
	6/29/2010	Not Sampled				Not Sampled				Not Sampled

Notes:

mg/L - milligrams per liter

TDS - total dissolved solids

< - less than laboratory reporting limit

FIGURES

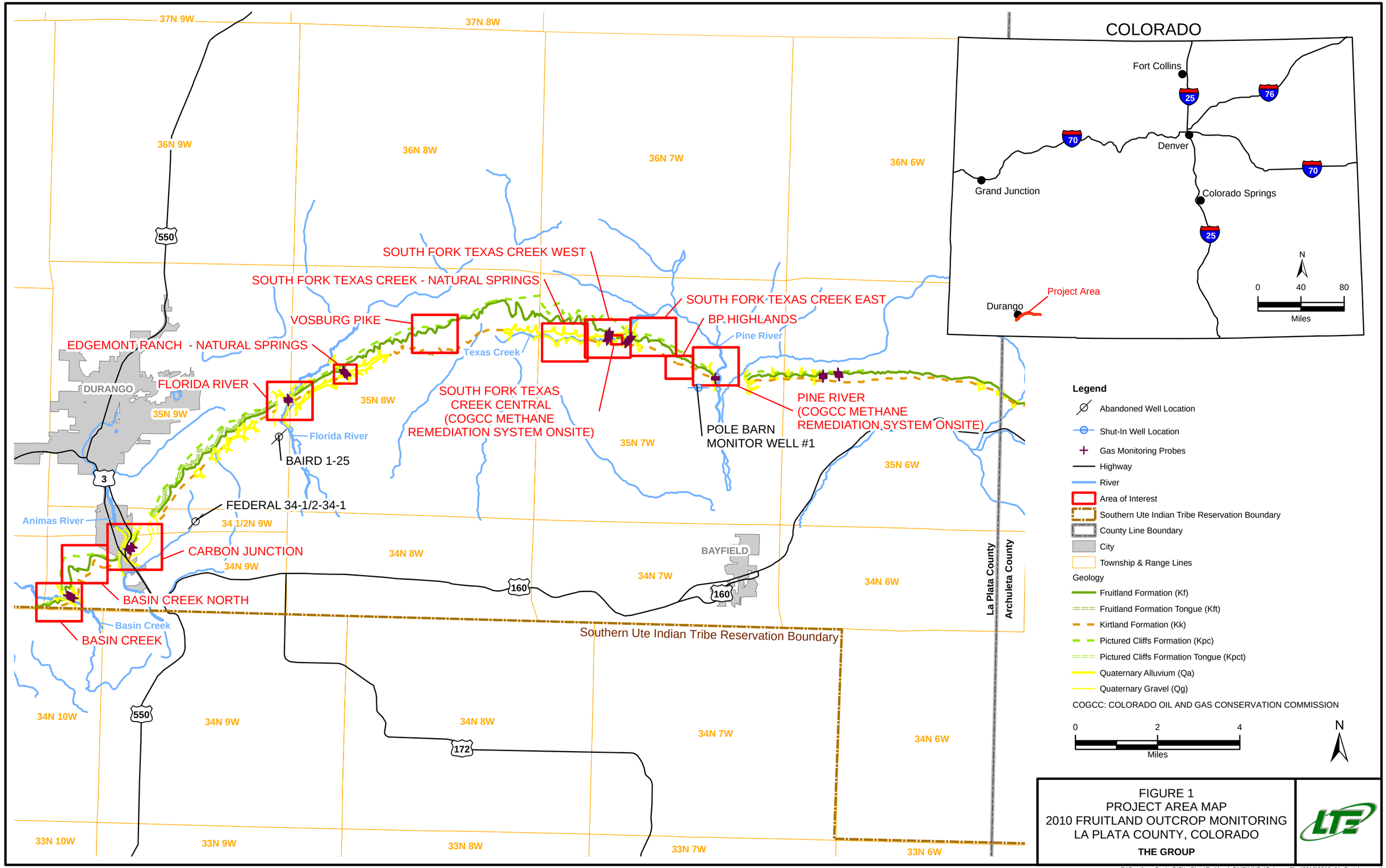

FIGURE 1
PROJECT AREA MAP
2010 FRUITLAND OUTCROP MONITORING
LA PLATA COUNTY, COLORADO

THE GROUP

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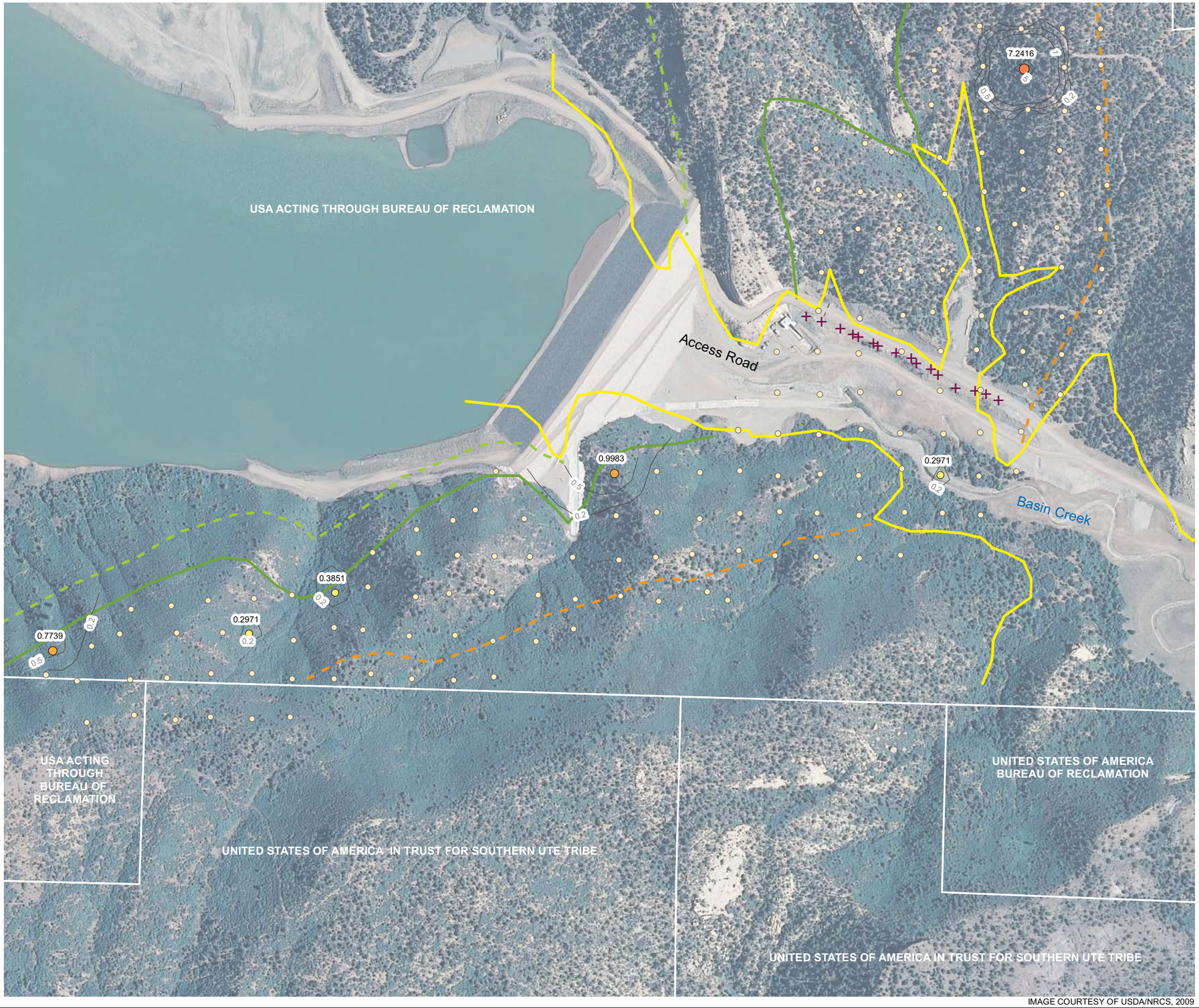

IMAGE COURTESY OF USDA/NRCS, 2009

LEGEND

- Gas Monitoring Probes
- Parcel Boundary & Owner (white)
- Methane Flux Contour in mol/m^2 • day (Interval Varies)

Methane Flux Measurement (mol/m^2 • day)

- 0.0000 - 0.1999
- 0.2000 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 10.0000
- 10.0001 - 50.0000
- 50.0001 - 100.0000
- 100.0001 - 220.0000

Geology

- Fruitland Formation (Kf)
- Fruitland Formation Tongue (Kft)
- Kirtland Formation (Kk)
- Pictured Cliffs Formation (Kpc)
- Pictured Cliffs Formation Tongue (Kpct)
- Quaternary Alluvium (Qa)
- Quaternary Gravel (Qg)

mol/m^2 • day - moles per square meter per day

Flux points not labeled are less than 0.2000 mol/m^2 • day Methane

0 500 1,000
Feet

N

FIGURE 2
METHANE FLUX CONTOURS
BASIN CREEK
2010 FRUITLAND OUTCROP MONITORING
LA PLATA COUNTY, COLORADO

THE GROUP

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LEGEND

- Gas Monitoring Probes
- Parcel Boundary & Owner (white)
- Carbon Dioxide Flux Contour in mol/m^2 • day (Interval Varies)

Carbon Dioxide Flux Measurement (mol/m^2 • day)

- 0.0000 - 0.0100
- 0.0101 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 5.0000
- 5.0001 - 10.0000

Geology

- Fruitland Formation (Kf)
- Fruitland Formation Tongue (Kft)
- Kirtland Formation (Kk)
- Pictured Cliffs Formation (Kpc)
- Pictured Cliffs Formation Tongue (Kpct)
- Quaternary Alluvium (Qa)
- Quaternary Gravel (Qg)

mol/m^2 • day - moles per square meter per day

Flux points not labeled are 0.0000 mol/m^2 • day Carbon Dioxide

0 500 1,000
Feet

N

FIGURE 3
CARBON DIOXIDE FLUX CONTOURS
BASIN CREEK
2010 FRUITLAND OUTCROP MONITORING
LA PLATA COUNTY, COLORADO

THE GROUP

P:\San Juan Basin GIS\LaPlata\Fruitland_OMR\MXDs\Subgas_Flux\2010\2010_02_CH4_FLUX_CONTOURS.mxd

IMAGE COURTESY OF USDA/NRCS, 2009

LEGEND

- Gas Monitoring Probes
- Parcel Boundary & Owner (white)
- Methane Flux Contour in mol/m^2 • day (Interval Varies)

Methane Flux Measurement (mol/m^2 • day)

- 0.0000 - 0.1999
- 0.2000 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 10.0000
- 10.0001 - 50.0000
- 50.0001 - 100.0000
- 100.0001 - 220.0000

Geology

- Fruitland Formation (Kf)
- Fruitland Formation Tongue (Kft)
- Kirtland Formation (Kk)
- Pictured Cliffs Formation (Kpc)
- Pictured Cliffs Formation Tongue (Kpct)
- Quaternary Alluvium (Qa)
- Quaternary Gravel (Qg)

mol/m^2 • day - moles per square meter per day

Flux points not labeled are less than 0.2000 mol/m^2 • day Methane

0 500 1,000
Feet

N

FIGURE 4
METHANE FLUX CONTOURS
BASIN CREEK NORTH
2010 FRUITLAND OUTCROP MONITORING
LA PLATA COUNTY, COLORADO

THE GROUP

P:\San Juan Basin GIS\LaPlata\Fruitland_OMR\MXDs\Subgas_Flux\2010\2010_02_CH4_FLUX_CONTOURS.mxd

LEGEND

- Gas Monitoring Probes
- Parcel Boundary & Owner (white)
- Carbon Dioxide Flux Contour in mol/m^2 • day (Interval Varies)

Carbon Dioxide Flux Measurement (mol/m ^{2} • day)

- 0.0000 - 0.0100
- 0.0101 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 5.0000
- 5.0001 - 10.0000

Geology

- Fruitland Formation (Kf)
- Fruitland Formation Tongue (Kft)
- Kirtland Formation (Kk)
- Pictured Cliffs Formation (Kpc)
- Pictured Cliffs Formation Tongue (Kpct)
- Quaternary Alluvium (Qa)
- Quaternary Gravel (Qg)

mol/m^2 • day - moles per square meter per day

Flux points not labeled are 0.0000 mol/m^2 • day Carbon Dioxide

0 500 1,000
Feet

N

FIGURE 5
CARBON DIOXIDE FLUX CONTOURS
BASIN CREEK NORTH
2010 FRUITLAND OUTCROP MONITORING
LA PLATA COUNTY, COLORADO
THE GROUP

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LEGEND

- Gas Monitoring Probes
- Parcel Boundary & Owner (white)
- Methane Flux Contour in mol/m^2 • day (Interval Varies)

Methane Flux Measurement (mol/m^2 • day)

- 0.0000 - 0.1999
- 0.2000 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 10.0000
- 10.0001 - 50.0000
- 50.0001 - 100.0000
- 100.0001 - 220.0000

Geology

- Fruitland Formation (Kf)
- Fruitland Formation Tongue (Kft)
- Kirtland Formation (Kk)
- Pictured Cliffs Formation (Kpc)
- Pictured Cliffs Formation Tongue (Kpct)
- Quaternary Alluvium (Qa)
- Quaternary Gravel (Qg)

mol/m^2 • day - moles per square meter per day

Flux points not labeled are less than 0.2000 mol/m^2 • day Methane

0 600 1,200
Feet

N

FIGURE 6
METHANE FLUX CONTOURS
CARBON JUNCTION
2010 FRUITLAND OUTCROP MONITORING
LA PLATA COUNTY, COLORADO
THE GROUP

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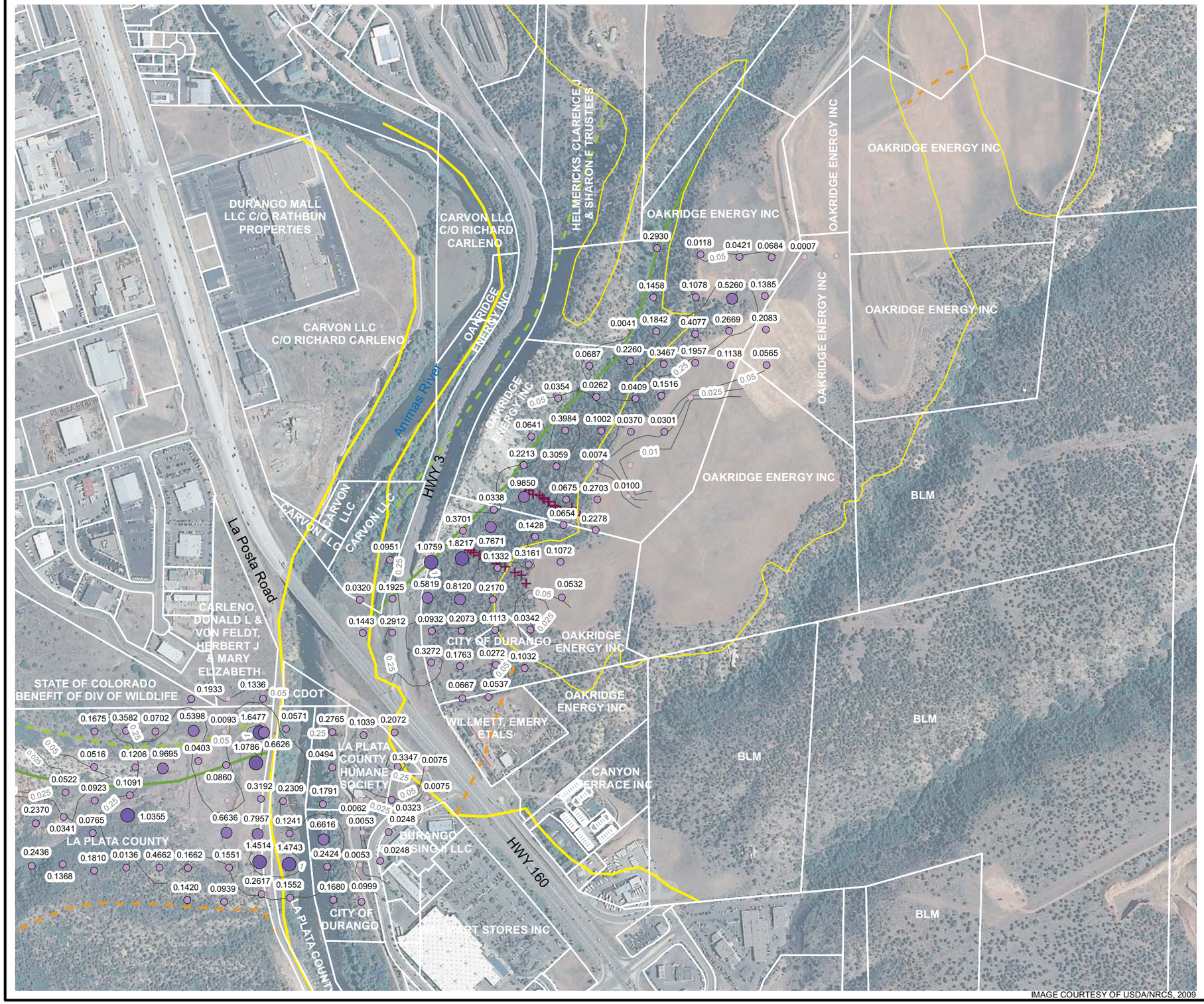

IMAGE COURTESY OF USDA/NRCS, 2009

LEGEND

- Gas Monitoring Probes
- Parcel Boundary & Owner (white)
- Carbon Dioxide Flux Contour in mol/m^2 • day (Interval Varies)

Carbon Dioxide Flux Measurement (mol/m^2 • day)

- 0.0000 - 0.0100
- 0.0101 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 5.0000
- 5.0001 - 10.0000

Geology

- Fruitland Formation (Kf)
- Fruitland Formation Tongue (Kft)
- Kirtland Formation (Kk)
- Pictured Cliffs Formation (Kpc)
- Pictured Cliffs Formation Tongue (Kpct)
- Quaternary Alluvium (Qa)
- Quaternary Gravel (Qg)

mol/m^2 • day - moles per square meter per day

Flux points not labeled are 0.0000 mol/m^2 • day Carbon Dioxide

0 600 1,200
Feet

N

FIGURE 7
CARBON DIOXIDE FLUX CONTOURS
CARBON JUNCTION
2010 FRUITLAND OUTCROP MONITORING
LA PLATA COUNTY, COLORADO

THE GROUP

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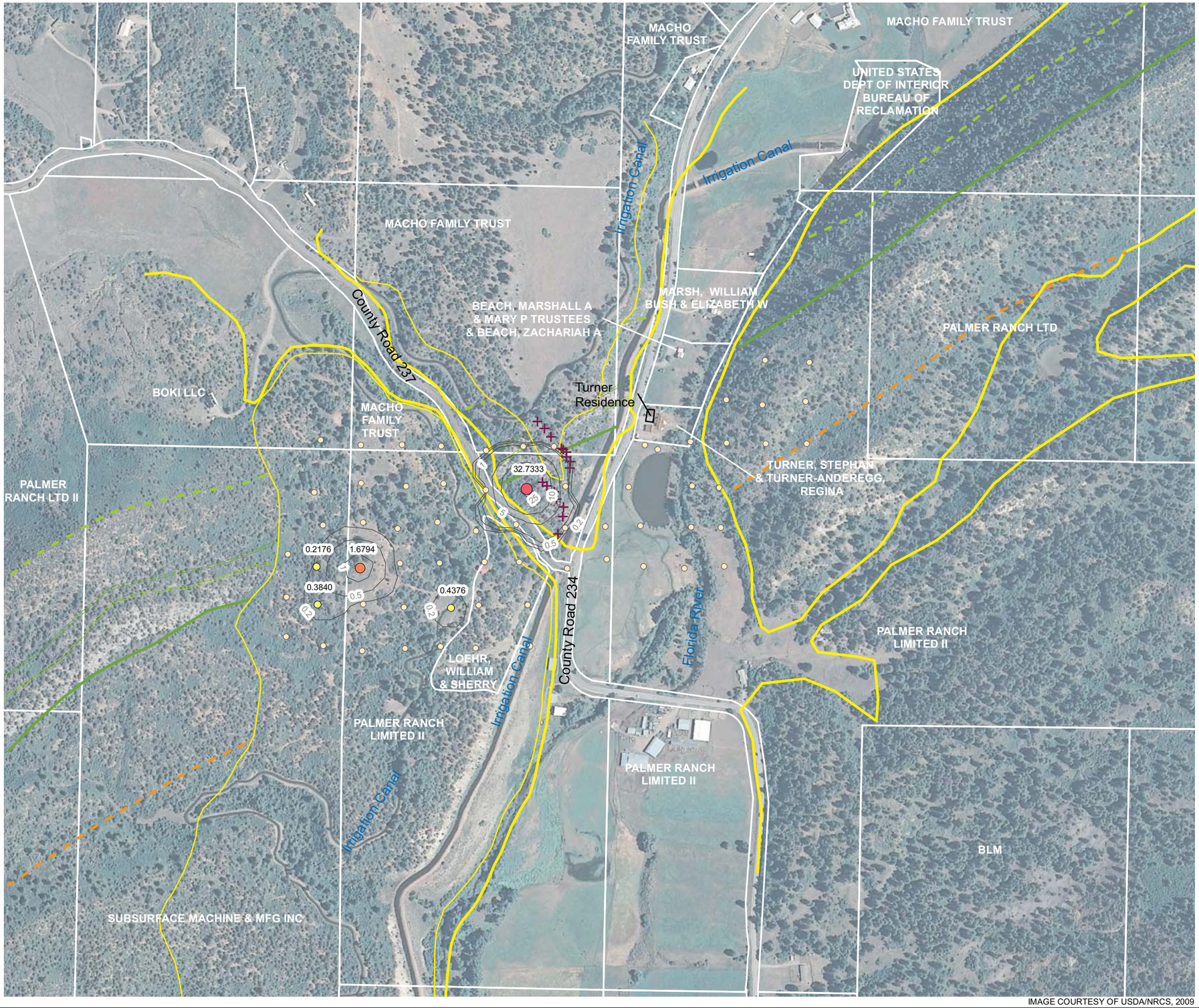

LEGEND

- Gas Monitoring Probes
- Parcel Boundary & Owner (white)
- Methane Flux Contour in mol/m^2 • day (Interval Varies)

Methane Flux Measurement (mol/m^2 • day)

- 0.0000 - 0.1999
- 0.2000 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 10.0000
- 10.0001 - 50.0000
- 50.0001 - 100.0000
- 100.0001 - 220.0000

Geology

- Fruitland Formation (Kf)
- Fruitland Formation Tongue (Kft)
- Kirtland Formation (Kk)
- Pictured Cliffs Formation (Kpc)
- Pictured Cliffs Formation Tongue (Kpct)
- Quaternary Alluvium (Qa)
- Quaternary Gravel (Qg)

mol/m^2 • day - moles per square meter per day

Flux points not labeled are less than 0.2000 mol/m^2 • day Methane

0 500 1,000
Feet

N

FIGURE 8
METHANE FLUX CONTOURS
FLORIDA RIVER
2010 FRUITLAND OUTCROP MONITORING
LA PLATA COUNTY, COLORADO

THE GROUP

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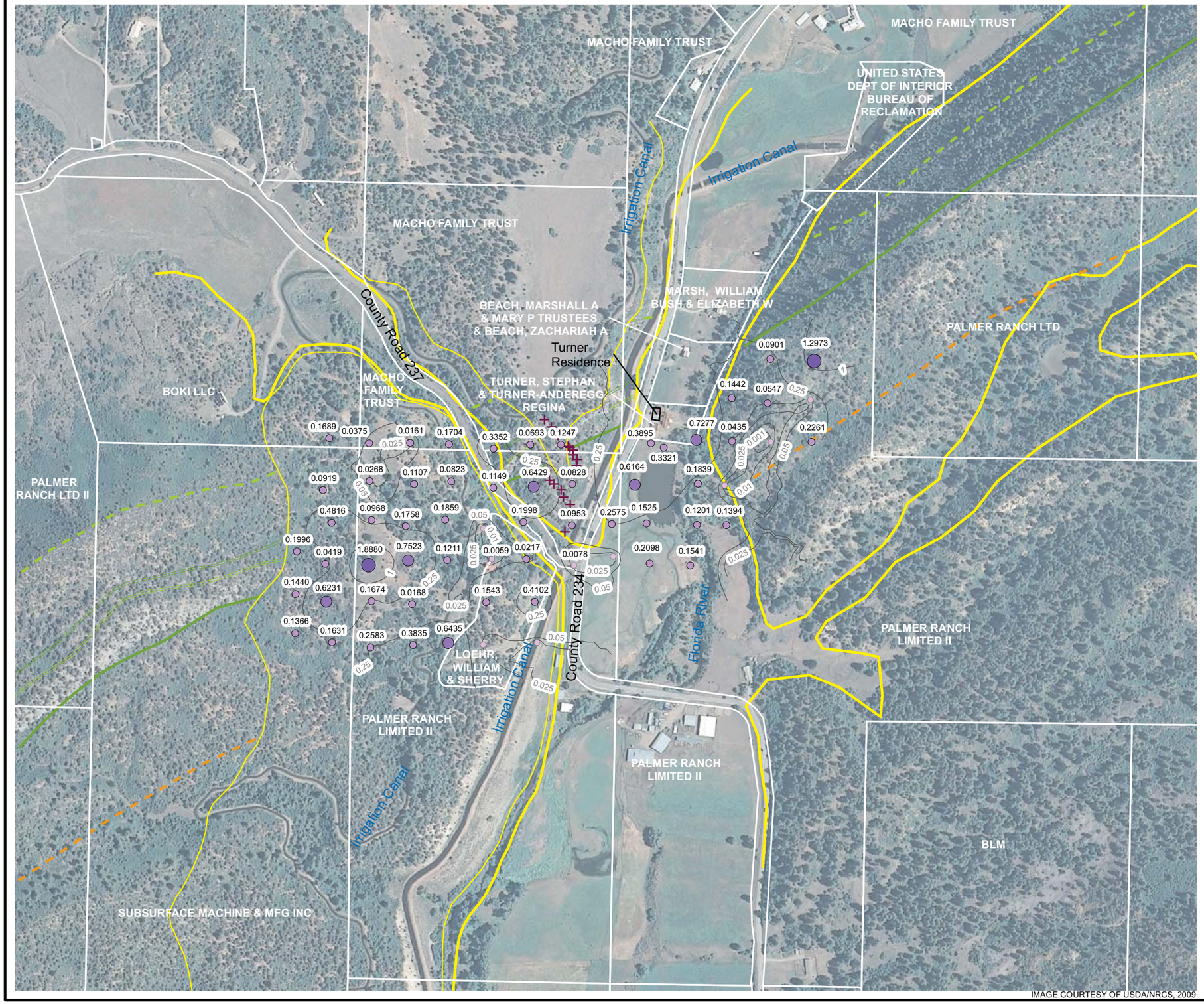

LEGEND

- Gas Monitoring Probes
- Parcel Boundary & Owner (white)
- Carbon Dioxide Flux Contour in mol/m^2 • day (Interval Varies)

Carbon Dioxide Flux Measurement (mol/m^2 • day)

- 0.0000 - 0.0100
- 0.0101 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 5.0000
- 5.0001 - 10.0000

Geology

- Fruitland Formation (Kf)
- Fruitland Formation Tongue (Kft)
- Kirtland Formation (Kk)
- Pictured Cliffs Formation (Kpc)
- Pictured Cliffs Formation Tongue (Kpct)
- Quaternary Alluvium (Qa)
- Quaternary Gravel (Qg)

mol/m^2 • day - moles per square meter per day

Flux points not labeled are 0.0000 mol/m^2 • day Carbon Dioxide

0 500 1,000
Feet

N

IMAGE COURTESY OF USDA/NRCS, 2009

FIGURE 9
CARBON DIOXIDE FLUX CONTOURS
FLORIDA RIVER
2010 FRUITLAND OUTCROP MONITORING
LA PLATA COUNTY, COLORADO
THE GROUP

P:\San Juan Basin GIS\LaPlata\Fruitland_OMR\MXDs\Subgas_Flux\2010\2010_02_CH4_FLUX_CONTOURS.mxd

IMAGE COURTESY OF USDA/NRCS, 2009

LEGEND

- Gas Monitoring Probes
- Parcel Boundary & Owner (white)
- Methane Flux Contour in mol/m^2 • day (Interval Varies)

Methane Flux Measurement (mol/m^2 • day)

- 0.0000 - 0.1999
- 0.2000 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 10.0000
- 10.0001 - 50.0000
- 50.0001 - 100.0000
- 100.0001 - 220.0000

Geology

- Fruitland Formation (Kf)
- Fruitland Formation Tongue (Kft)
- Kirtland Formation (Kk)
- Pictured Cliffs Formation (Kpc)
- Pictured Cliffs Formation Tongue (Kpct)
- Quaternary Alluvium (Qa)
- Quaternary Gravel (Qg)

mol/m^2 • day - moles per square meter per day

Flux points not labeled are less than 0.2000 mol/m^2 • day Methane

0 500 1,000
Feet

N

FIGURE 10
METHANE FLUX CONTOURS
VOSBURG PIKE
2010 FRUITLAND OUTCROP MONITORING
LA PLATA COUNTY, COLORADO
THE GROUP

P:\San Juan Basin GIS\LaPlata\Fruitland_OMR\MXDs\Subgas_Flux\2010\2010_02_CH4_FLUX_CONTOURS.mxd

IMAGE COURTESY OF USDA/NRCS, 2009

LEGEND

- Gas Monitoring Probes
- Parcel Boundary & Owner (white)
- Carbon Dioxide Flux Contour in mol/m^2 • day (Interval Varies)

Carbon Dioxide Flux Measurement (mol/m ^{2} • day)

- 0.0000 - 0.0100
- 0.0101 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 5.0000
- 5.0001 - 10.0000

Geology

- Fruitland Formation (Kf)
- Fruitland Formation Tongue (Kft)
- Kirtland Formation (Kk)
- Pictured Cliffs Formation (Kpc)
- Pictured Cliffs Formation Tongue (Kpct)
- Quaternary Alluvium (Qa)
- Quaternary Gravel (Qg)

mol/m^2 • day - moles per square meter per day

Flux points not labeled are 0.0000 mol/m^2 • day Carbon Dioxide

0 500 1,000
Feet

N

FIGURE 11
CARBON DIOXIDE FLUX CONTOURS
VOSBURG PIKE
2010 FRUITLAND OUTCROP MONITORING
LA PLATA COUNTY, COLORADO
THE GROUP

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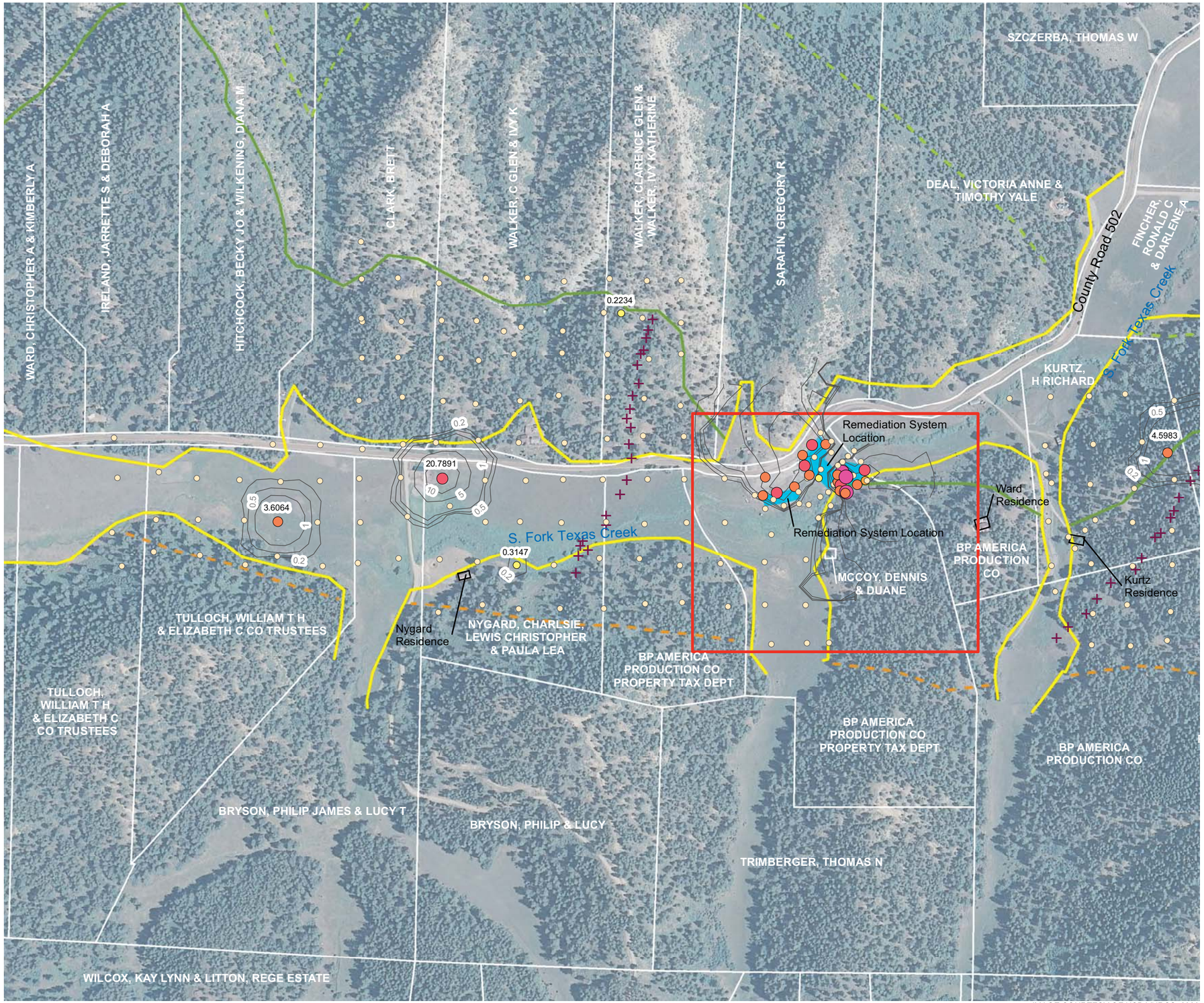

LEGEND

- Gas Monitoring Probes
- Parcel Boundary & Owner (white)
- Remediation System Location
- South Fork Texas Creek Central
- Methane Flux Contour in mol/m^2 • day (Interval Varies)

Methane Flux Measurement (mol/m^2 • day)

- 0.0000 - 0.1999
- 0.2000 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 10.0000
- 10.0001 - 50.0000
- 50.0001 - 100.0000
- 100.0001 - 220.0000

Geology

- Fruitland Formation (Kf)
- Fruitland Formation Tongue (Kft)
- Kirtland Formation (Kk)
- Pictured Cliffs Formation (Kpc)
- Pictured Cliffs Formation Tongue (Kpct)
- Quaternary Alluvium (Qa)
- Quaternary Gravel (Qg)

mol/m^2 • day - moles per square meter per day

Flux points not labeled are less than 0.2000 mol/m^2 • day Methane

0 500 1,000
Feet

N

FIGURE 12
METHANE FLUX CONTOURS
SOUTH FORK TEXAS CREEK WEST
2010 FRUITLAND OUTCROP MONITORING
LA PLATA COUNTY, COLORADO
THE GROUP

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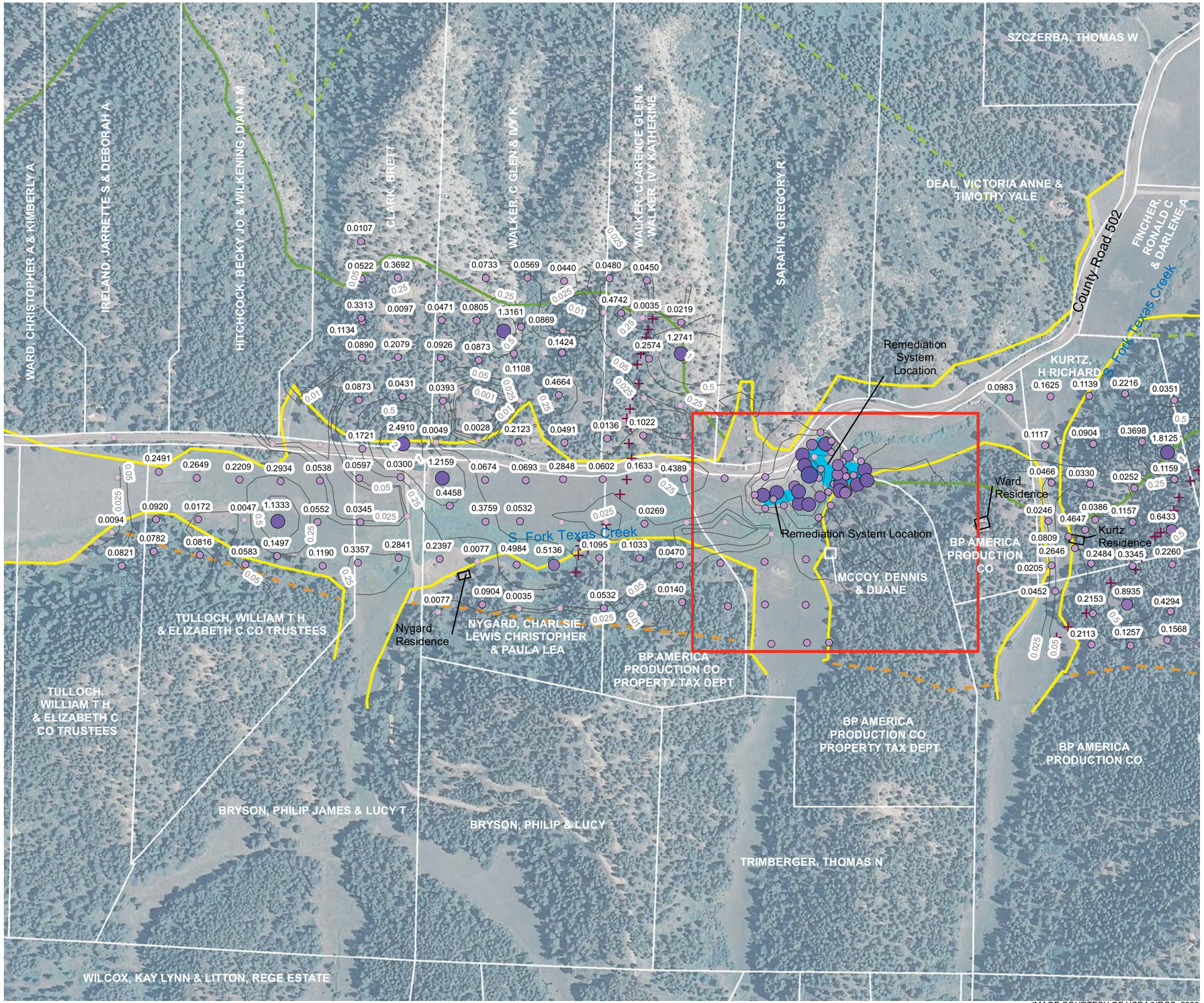

LEGEND

- Gas Monitoring Probes
- Parcel Boundary & Owner (white)
- Remediation System Location
- South Fork Texas Creek Central
- Carbon Dioxide Flux Contour in mol/m^2 • day (Interval Varies)

Carbon Dioxide Flux Measurement (mol/m^2 • day)

- 0.0000 - 0.0100
- 0.0101 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 5.0000
- 5.0001 - 10.0000

Geology

- Fruitland Formation (Kf)
- Fruitland Formation Tongue (Kft)
- Kirtland Formation (Kk)
- Pictured Cliffs Formation (Kpc)
- Pictured Cliffs Formation Tongue (Kpct)
- Quaternary Alluvium (Qa)
- Quaternary Gravel (Qg)

mol/m^2 • day - moles per square meter per day

Flux points not labeled are 0.0000 mol/m^2 • day Carbon Dioxide

0 500 1,000
Feet

N

FIGURE 13
CARBON DIOXIDE FLUX CONTOURS SOUTH FORK TEXAS CREEK WEST 2010 FRUITLAND OUTCROP MONITORING LA PLATA COUNTY, COLORADO

THE GROUP

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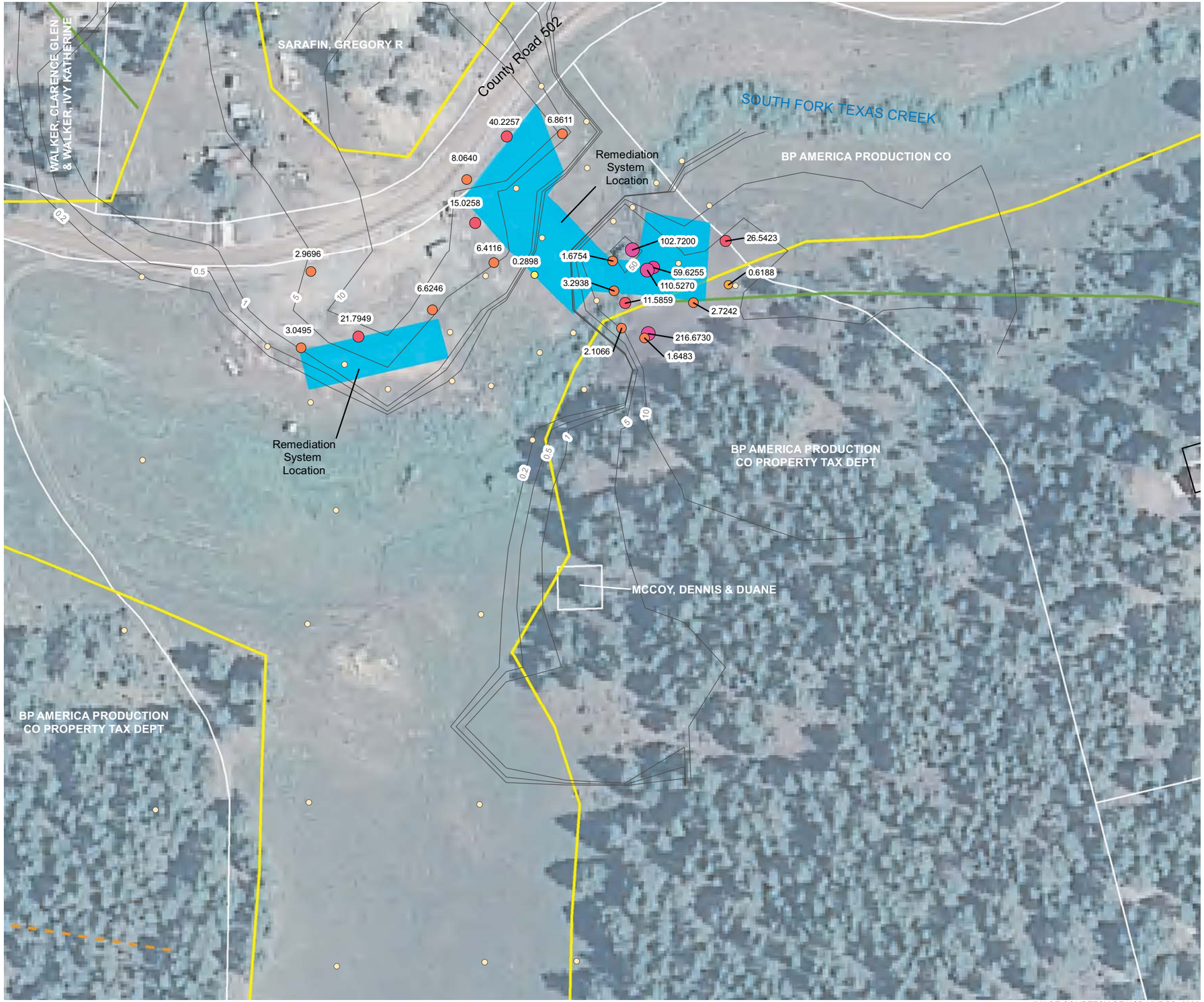

IMAGE COURTESY OF USDA/NRCS, 2009

LEGEND

- Gas Monitoring Probes
- Parcel Boundary & Owner (white)
- Remediation System Location
- Methane Flux Contour in mol/m^2 • day (Interval Varies)

Methane Flux Measurement (mol/m^2 • day)

- 0.0000 - 0.1999
- 0.2000 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 10.0000
- 10.0001 - 50.0000
- 50.0001 - 100.0000
- 100.0001 - 220.0000

Geology

- Fruitland Formation (Kf)
- Fruitland Formation Tongue (Kft)
- Kirtland Formation (Kk)
- Pictured Cliffs Formation (Kpc)
- Pictured Cliffs Formation Tongue (Kpct)
- Quaternary Alluvium (Qa)
- Quaternary Gravel (Qg)

mol/m^2 • day - moles per square meter per day

Flux points not labeled are less than 0.2000 mol/m^2 • day Methane

0 120 240
Feet

N

FIGURE 14
METHANE FLUX CONTOURS
SOUTH FORK TEXAS CREEK CENTRAL
2010 FRUITLAND OUTCROP MONITORING
LA PLATA COUNTY, COLORADO
THE GROUP

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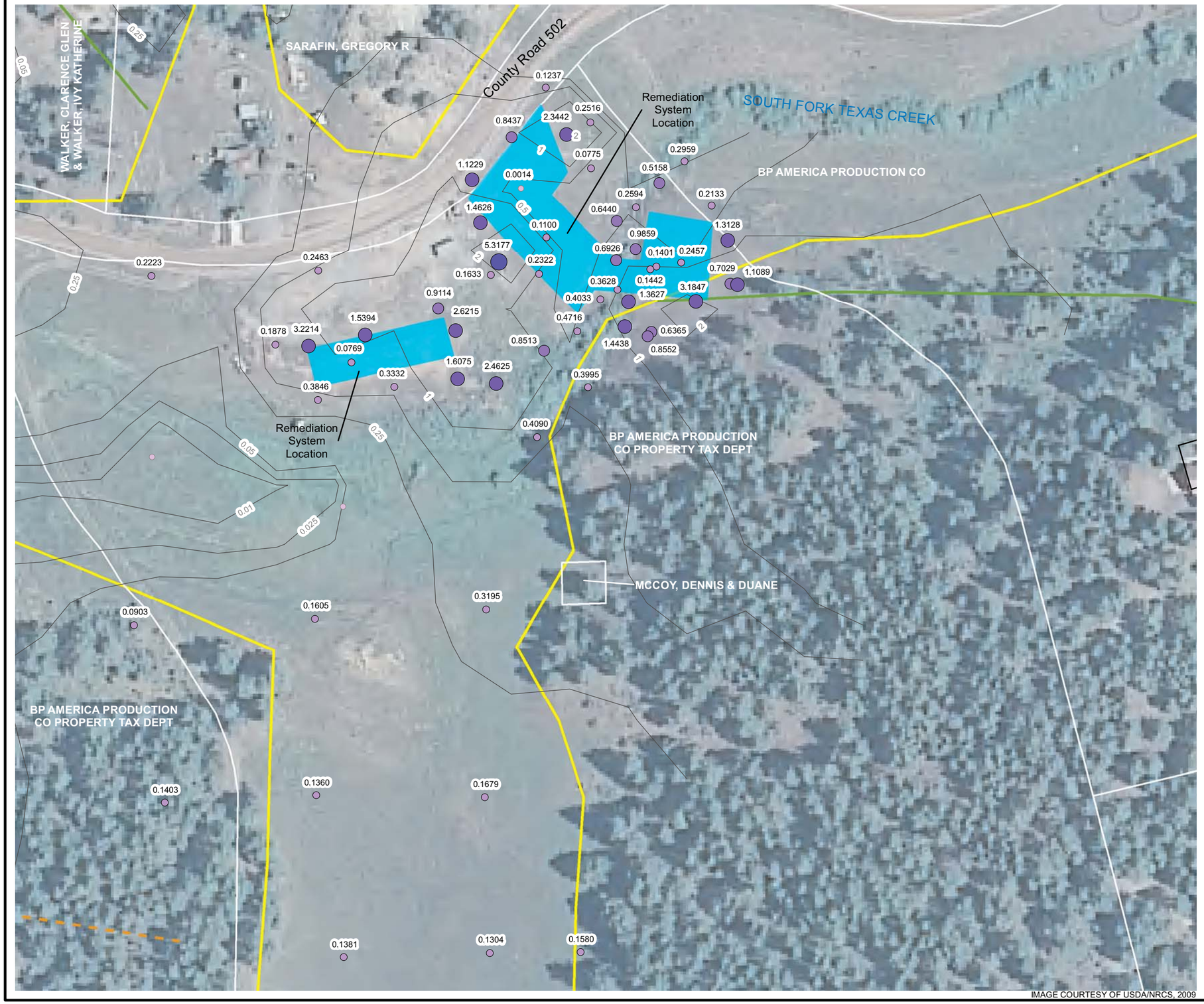


LEGEND

- Gas Monitoring Probes
- Parcel Boundary & Owner (white)
- Remediation System Location
- Carbon Dioxide Flux Contour in mol/m^2 • day (Interval Varies)

Carbon Dioxide Flux Measurement (mol/m^2 • day)

- 0.0000 - 0.0100
- 0.0101 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 5.0000
- 5.0001 - 10.0000

Geology

- Fruitland Formation (Kf)
- Fruitland Formation Tongue (Kft)
- Kirtland Formation (Kk)
- Pictured Cliffs Formation (Kpc)
- Pictured Cliffs Formation Tongue (Kpct)
- Quaternary Alluvium (Qa)
- Quaternary Gravel (Qg)

mol/m^2 • day - moles per square meter per day

Flux points not labeled are 0.0000 mol/m^2 • day Carbon Dioxide

0 120 240
Feet

N

FIGURE 15
CARBON DIOXIDE FLUX CONTOURS
SOUTH FORK TEXAS CREEK CENTRAL
2010 FRUITLAND OUTCROP MONITORING
LA PLATA COUNTY, COLORADO

THE GROUP

P:\San Juan Basin GIS\LaPlata\Fruitland_OMR\MXDs\Subgas_Flux\2010\2010_02_CH4_FLUX_CONTOURS.mxd

IMAGE COURTESY OF USDA/NRCS, 2009

LEGEND

- Gas Monitoring Probes
- Parcel Boundary & Owner (white)
- Methane Flux Contour in mol/m^2 • day (Interval Varies)

Methane Flux Measurement (mol/m^2 • day)

- 0.0000 - 0.1999
- 0.2000 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 10.0000
- 10.0001 - 50.0000
- 50.0001 - 100.0000
- 100.0001 - 220.0000

Geology

- Fruitland Formation (Kf)
- Fruitland Formation Tongue (Kft)
- Kirtland Formation (Kk)
- Pictured Cliffs Formation (Kpc)
- Pictured Cliffs Formation Tongue (Kpct)
- Quaternary Alluvium (Qa)
- Quaternary Gravel (Qg)

mol/m^2 • day - moles per square meter per day

Flux points not labeled are less than 0.2000 mol/m^2 • day Methane

0 500 1,000
Feet

N

FIGURE 16
METHANE FLUX CONTOURS
SOUTH FORK TEXAS CREEK EAST
2010 FRUITLAND OUTCROP MONITORING
LA PLATA COUNTY, COLORADO
THE GROUP

P:\San Juan Basin GIS\LaPlata\Fruitland_OMR\MXDs\Subgas_Flux\2010\2010_02_CH4_FLUX_CONTOURS.mxd

LEGEND

- Gas Monitoring Probes
- Parcel Boundary & Owner (white)
- Carbon Dioxide Flux Contour in mol/m^2 • day (Interval Varies)

Carbon Dioxide Flux Measurement (mol/m^2 • day)

- 0.0000 - 0.0100
- 0.0101 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 5.0000
- 5.0001 - 10.0000

Geology

- Fruitland Formation (Kf)
- Fruitland Formation Tongue (Kft)
- Kirtland Formation (Kk)
- Pictured Cliffs Formation (Kpc)
- Pictured Cliffs Formation Tongue (Kpct)
- Quaternary Alluvium (Qa)
- Quaternary Gravel (Qg)

mol/m^2 • day - moles per square meter per day

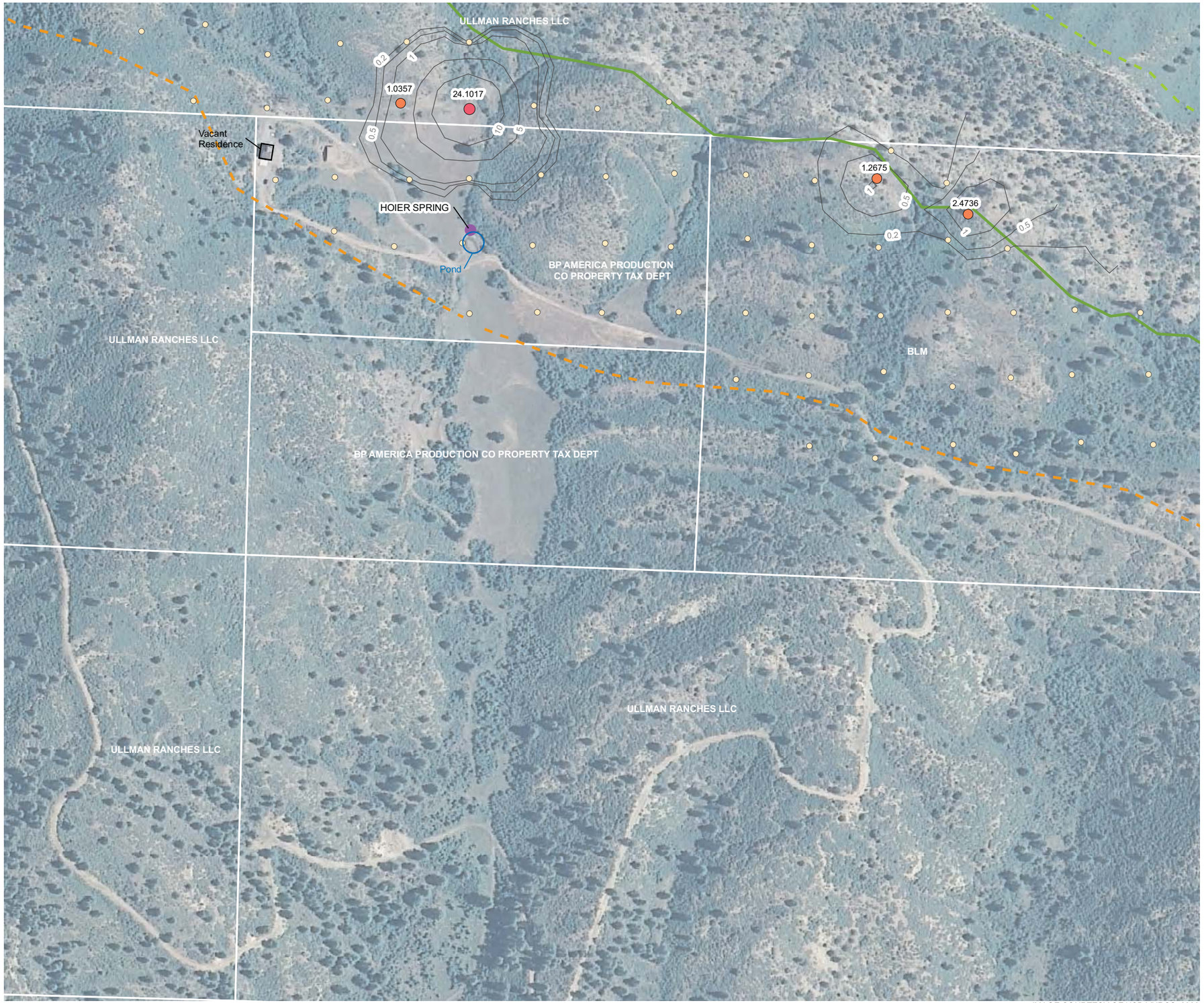
Flux points not labeled are 0.0000 mol/m^2 • day Carbon Dioxide

0 500 1,000
Feet

N

FIGURE 17
CARBON DIOXIDE FLUX CONTOURS
SOUTH FORK TEXAS CREEK EAST
2010 FRUITLAND OUTCROP MONITORING
LA PLATA COUNTY, COLORADO
THE GROUP

P:\San Juan Basin GIS\LaPlata\Fruitland_OMR\MXDs\Subgas_Flux\2010\2010_02_CH4_FLUX_CONTOURS.mxd



LEGEND

- Gas Monitoring Probes
- Parcel Boundary & Owner (white)

Natural Spring Location

- Sampled
- Field Parameters Only
- Dry
- Not Located
- No Access
- Methane Flux Contour in mol/m^2 • day (Interval Varies)

Methane Flux Measurement (mol/m^2 • day)

- 0.0000 - 0.1999
- 0.2000 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 10.0000
- 10.0001 - 50.0000
- 50.0001 - 100.0000
- 100.0001 - 220.0000

Geology

- Fruitland Formation (Kf)
- Fruitland Formation Tongue (Kft)
- Kirtland Formation (Kk)
- Pictured Cliffs Formation (Kpc)
- Pictured Cliffs Formation Tongue (Kpct)
- Quaternary Alluvium (Qa)
- Quaternary Gravel (Qg)

mol/m^2 • day - moles per square meter per day

Flux points not labeled are less than 0.2000 mol/m^2 • day Methane

0 300 600
Feet

N

FIGURE 18
METHANE FLUX CONTOURS
BP HIGHLANDS
2010 FRUITLAND OUTCROP MONITORING
LA PLATA COUNTY, COLORADO
THE GROUP

P:\San Juan Basin GIS\LaPlata\Fruitland_OMR\MXDs\Subgas_Flux\2010\2010_02_CH4_FLUX_CONTOURS.mxd

IMAGE COURTESY OF USDA/NRCS, 2009

LEGEND

- Gas Monitoring Probes
- Parcel Boundary & Owner (white)

Natural Spring Location

- Sampled
- Field Parameters Only
- Dry
- Not Located
- No Access
- Carbon Dioxide Flux Contour in mol/m^2 • day (Interval Varies)

Carbon Dioxide Flux Measurement (mol/m^2 • day)

- 0.0000 - 0.0100
- 0.0101 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 5.0000
- 5.0001 - 10.0000

Geology

- Fruitland Formation (Kf)
- Fruitland Formation Tongue (Kft)
- Kirtland Formation (Kk)
- Pictured Cliffs Formation (Kpc)
- Pictured Cliffs Formation Tongue (Kpct)
- Quaternary Alluvium (Qa)
- Quaternary Gravel (Qg)

mol/m^2 • day - moles per square meter per day

Flux points not labeled are 0.0000 mol/m^2 • day Carbon Dioxide

0 300 600
Feet

N

FIGURE 19
CARBON DIOXIDE FLUX CONTOURS
BP HIGHLANDS
2010 FRUITLAND OUTCROP MONITORING
LA PLATA COUNTY, COLORADO

THE GROUP

P:\San Juan Basin GIS\LaPlata\Fruitland_OMR\MXDs\Subgas_Flux\2010\2010_02_CH4_FLUX_CONTOURS.mxd

LEGEND

- Gas Monitoring Probes
- Parcel Boundary & Owner (white)
- Remediation System Location
- Methane Flux Contour in mol/m^2 • day (Interval Varies)

Methane Flux Measurement (mol/m^2 • day)

- 0.0000 - 0.1999
- 0.2000 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 10.0000
- 10.0001 - 50.0000
- 50.0001 - 100.0000
- 100.0001 - 220.0000

Geology

- Fruitland Formation (Kf)
- Fruitland Formation Tongue (Kft)
- Kirtland Formation (Kk)
- Pictured Cliffs Formation (Kpc)
- Pictured Cliffs Formation Tongue (Kpct)
- Quaternary Alluvium (Qa)
- Quaternary Gravel (Qg)

mol/m^2 • day - moles per square meter per day

Flux points not labeled are less than 0.2000 mol/m^2 • day Methane

0 500 1,000
Feet

N

FIGURE 20
METHANE FLUX CONTOURS
PINE RIVER
2010 FRUITLAND OUTCROP MONITORING
LA PLATA COUNTY, COLORADO

THE GROUP

P:\San Juan Basin GIS\LaPlata\Fruitland_OMR\MXDs\Subgas_Flux\2010\2010_02_CH4_FLUX_CONTOURS.mxd

LEGEND

- Gas Monitoring Probes
- Parcel Boundary & Owner (white)
- Remediation System Location
- Carbon Dioxide Flux Contour in mol/m^2 • day (Interval Varies)

Carbon Dioxide Flux Measurement (mol/m ^{2} • day)

- 0.0000 - 0.0100
- 0.0101 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 5.0000
- 5.0001 - 10.0000

Geology

- Fruitland Formation (Kf)
- Fruitland Formation Tongue (Kft)
- Kirtland Formation (Kk)
- Pictured Cliffs Formation (Kpc)
- Pictured Cliffs Formation Tongue (Kpct)
- Quaternary Alluvium (Qa)
- Quaternary Gravel (Qg)

mol/m^2 • day - moles per square meter per day

Flux points not labeled are 0.0000 mol/m^2 • day Carbon Dioxide

0 500 1,000
Feet

N

FIGURE 21
CARBON DIOXIDE FLUX CONTOURS
PINE RIVER
2010 FRUITLAND OUTCROP MONITORING
LA PLATA COUNTY, COLORADO

THE GROUP

P:\San Juan Basin GIS\LaPlata\Fruitland_OMR\MXDs\Subgas_Flux\2010\2010_02_CH4_FLUX_CONTOURS.mxd

VOSBURG PIKE

FLORIDA RIVER

SOUTH FORK TEXAS CREEK
TO PINE RIVER

VOSBURG PIKE

FLORIDA RIVER

SOUTH FORK TEXAS CREEK
TO PINE RIVER

BASIN CREEK TO
CARBON JUNCTION

BASIN CREEK
TO CARBON
JUNCTION

3

160

550

LEGEND

- 2007 Survey Area
- 2008 Survey Area
- 2009 Survey Area
- 2010 Survey Area
- Area of Interest
- Highway

IMAGES COURTESY OF USDA/NRCS, 2009

0 1.5 3
Miles

N

FIGURE 22
SURVEY AREA COMPARISON 2007-2010
2010 FRUITLAND OUTCROP MONITORING
LA PLATA COUNTY, COLORADO

THE GROUP

P:\San Juan Basin GIS\LaPlata\Fruitland_OMR\MXDs\Subgas_Flux\2010\2010_FIG_22_SURVEY_AREA.mxd

2007 FLUX SURVEY AREA

VOSBURG PIKE

FLORIDA RIVER

SOUTH FORK TEXAS CREEK TO PINE RIVER

BASIN CREEK TO CARBON JUNCTION

550

3

160

172

2008 FLUX SURVEY AREA

HORSE GULCH

IMAGES COURTESY OF USDA/NRCS, 2009

LEGEND

Methane Detected Greater than 0.2000 mol/m ^{2} • day

mol/m ^{2} • day: moles per square meter per day

Survey Boundary

Area of Interest

Highway

*SEE FIG 24 FOR COMPARISION WITH 2009 & 2010

0 1.75 3.5

Miles

N

FIGURE 23
METHANE FLUX COMPARISON 2007-2008
2010 FRUITLAND OUTCROP MONITORING
LA PLATA COUNTY, COLORADO

THE GROUP

P:\San Juan Basin GIS\LaPlata\Fruitland_OMR\MXDs\Subgas_Flux\2010\2010_FIG_23_CH4_COMP_2007-2008.mxd

2009 FLUX SURVEY AREA

VOSBURG PIKE

FLORIDA RIVER

SOUTH FORK TEXAS CREEK TO PINE RIVER

BASIN CREEK TO CARBON JUNCTION

550

3

160

172

550

160

2010 FLUX SURVEY AREA

VOSBURG PIKE

FLORIDA RIVER

SOUTH FORK TEXAS CREEK TO PINE RIVER

BASIN CREEK TO CARBON JUNCTION

550

3

160

172

550

160

IMAGES COURTESY OF USDA/NRCS, 2009

LEGEND

Methane Detected Greater than 0.2000 mol/m ^{2} • day

mol/m ^{2} • day: moles per square meter per day

Survey Boundary

Area of Interest

Highway

*SEE FIG 23 FOR COMPARISION WITH 2007 & 2008

0 1.75 3.5

Miles

N

FIGURE 24
METHANE FLUX COMPARISON 2009-2010
2010 FRUITLAND OUTCROP MONITORING
LA PLATA COUNTY, COLORADO

THE GROUP

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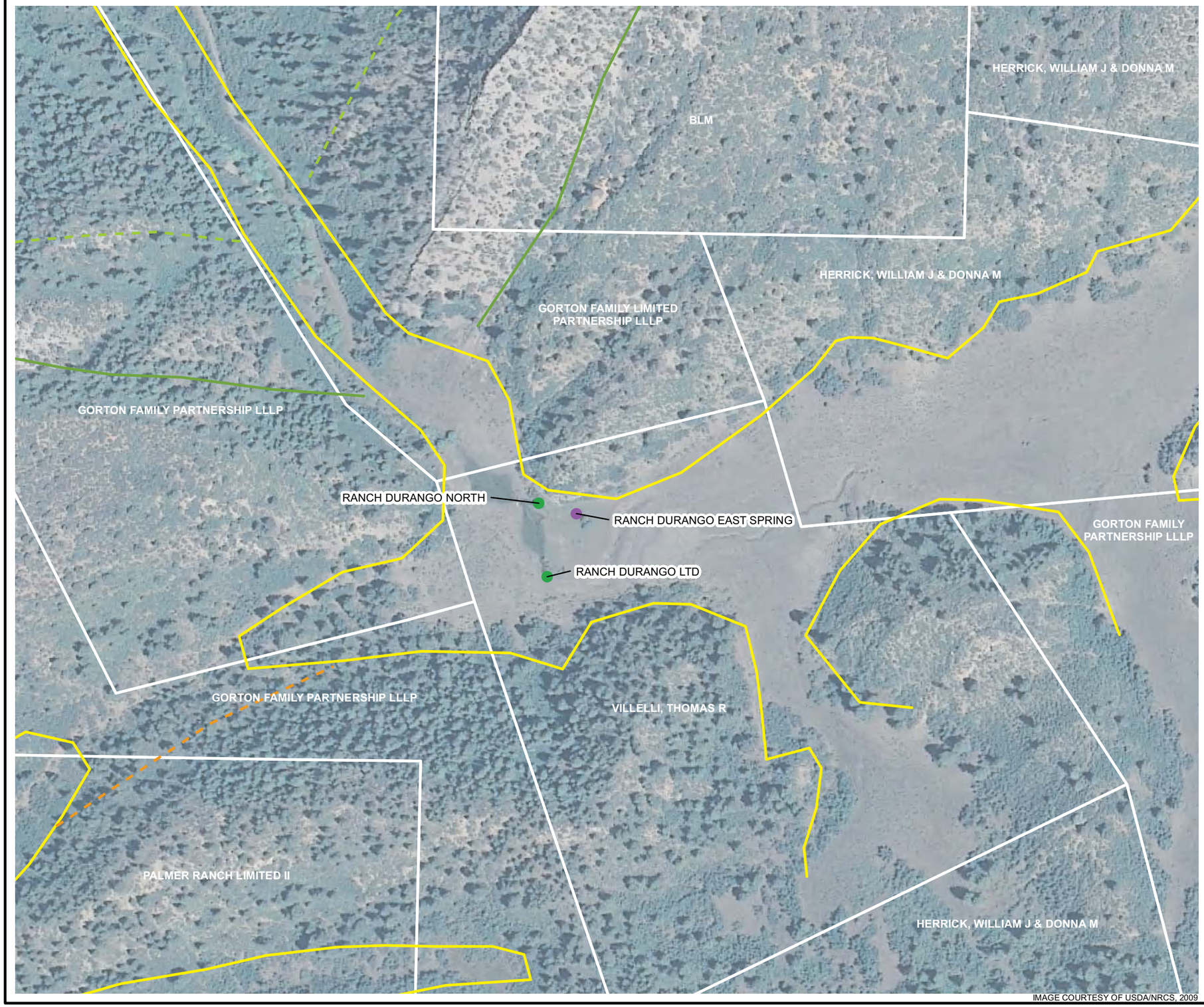

LEGEND

Parcel Boundary & Owner (white)

Natural Spring Location

- Sampled
- Field Parameters Only
- Dry
- Not Located
- No Access

Geology

- Fruitland Formation (Kf)
- Fruitland Formation Tongue (Kft)
- Kirtland Formation (Kk)
- Pictured Cliffs Formation (Kpc)
- Pictured Cliffs Formation Tongue (Kpct)
- Quaternary Alluvium (Qa)
- Quaternary Gravel (Qg)

* Subsurface methane measurements were collected from temporary soil probes advanced with a slide hammer at each spring location. The concentration of subsurface methane was 0 parts per million for all measurements taken.

0 250 500
Feet

N

FIGURE 25
DETAILED NATURAL SPRINGS MAP
EDGEMONT RANCH
2010 FRUITLAND OUTCROP MONITORING
LA PLATA COUNTY, COLORADO

THE GROUP

P:\San Juan Basin GIS\LaPlata\Fruitland_OMR\MXDs\Subgas_Flux\2010\2010_04_SPRINGS.mxd

LEGEND

Parcel Boundary & Owner (white)

Natural Spring Location

- Sampled
- Field Parameters Only
- Dry
- Not Located
- No Access

Geology

- Fruitland Formation (Kf)
- Fruitland Formation Tongue (Kft)
- Kirtland Formation (Kk)
- Pictured Cliffs Formation (Kpc)
- Pictured Cliffs Formation Tongue (Kpct)
- Quaternary Alluvium (Qa)
- Quaternary Gravel (Qg)

* Subsurface methane measurements were collected from temporary soil probes advanced with a slide hammer at each spring location. The concentration of subsurface methane was 0 parts per million for all measurements taken.

0 500 1,000
Feet

N

FIGURE 26
DETAILED NATURAL SPRINGS MAP
SOUTH FORK TEXAS CREEK
2010 FRUITLAND OUTCROP MONITORING
LA PLATA COUNTY, COLORADO

THE GROUP

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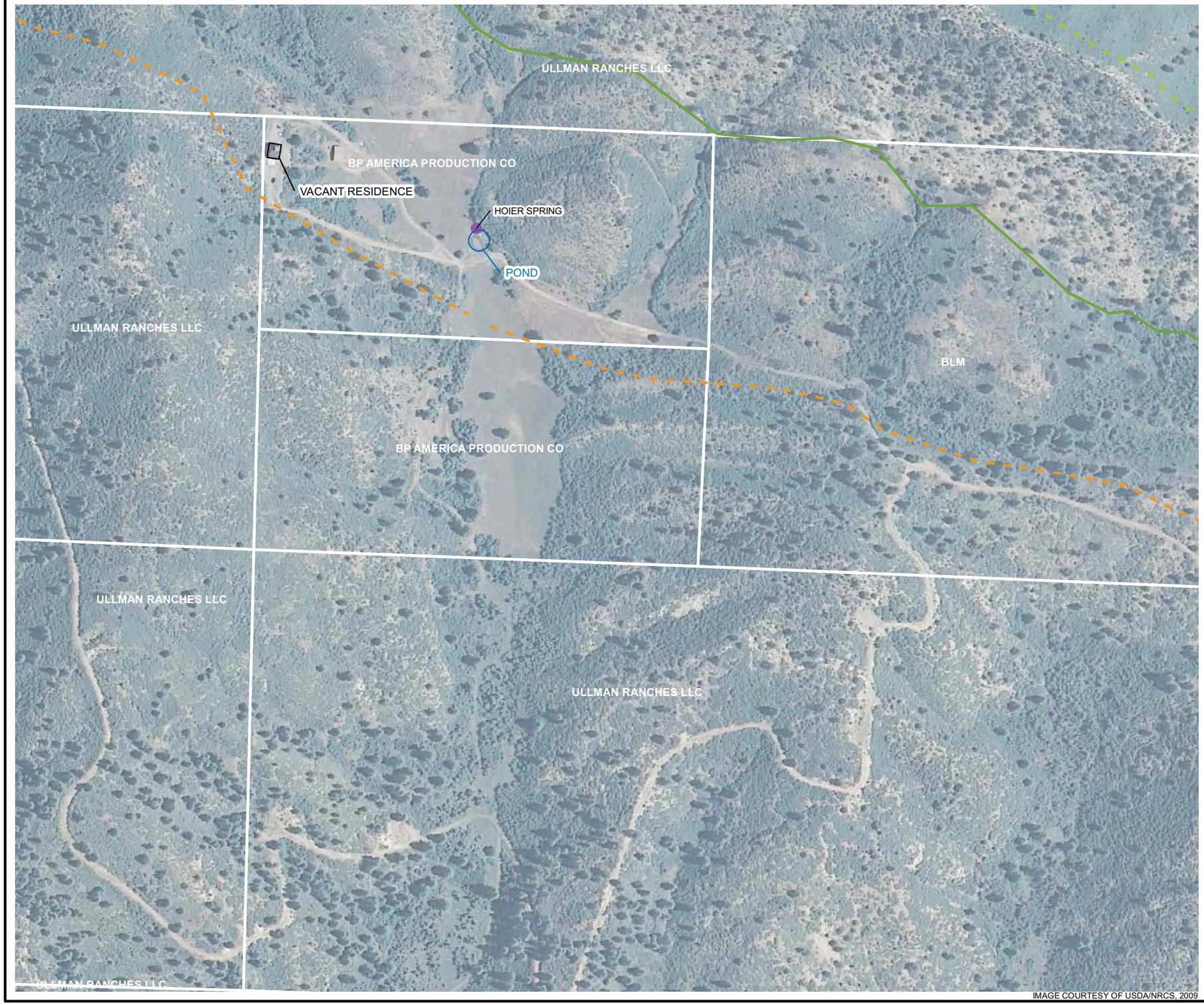

IMAGE COURTESY OF USDA/NRCS, 2009

LEGEND

Parcel Boundary & Owner (white)

Natural Spring Location

- Sampled
- Field Parameters Only
- Dry
- Not Located
- No Access

Geology

- Fruitland Formation (Kf)
- Fruitland Formation Tongue (Kft)
- Kirtland Formation (Kk)
- Pictured Cliffs Formation (Kpc)
- Pictured Cliffs Formation Tongue (Kpct)
- Quaternary Alluvium (Qa)
- Quaternary Gravel (Qg)

* Subsurface methane measurements were collected from temporary soil probes advanced with a slide hammer at each spring location. The concentration of subsurface methane was 0 parts per million for all measurements taken.

0 300 600
Feet

N

FIGURE 27
DETAILED NATURAL SPRING MAP
BP HIGHLANDS
2010 FRUITLAND OUTCROP MONITORING
LA PLATA COUNTY, COLORADO

THE GROUP

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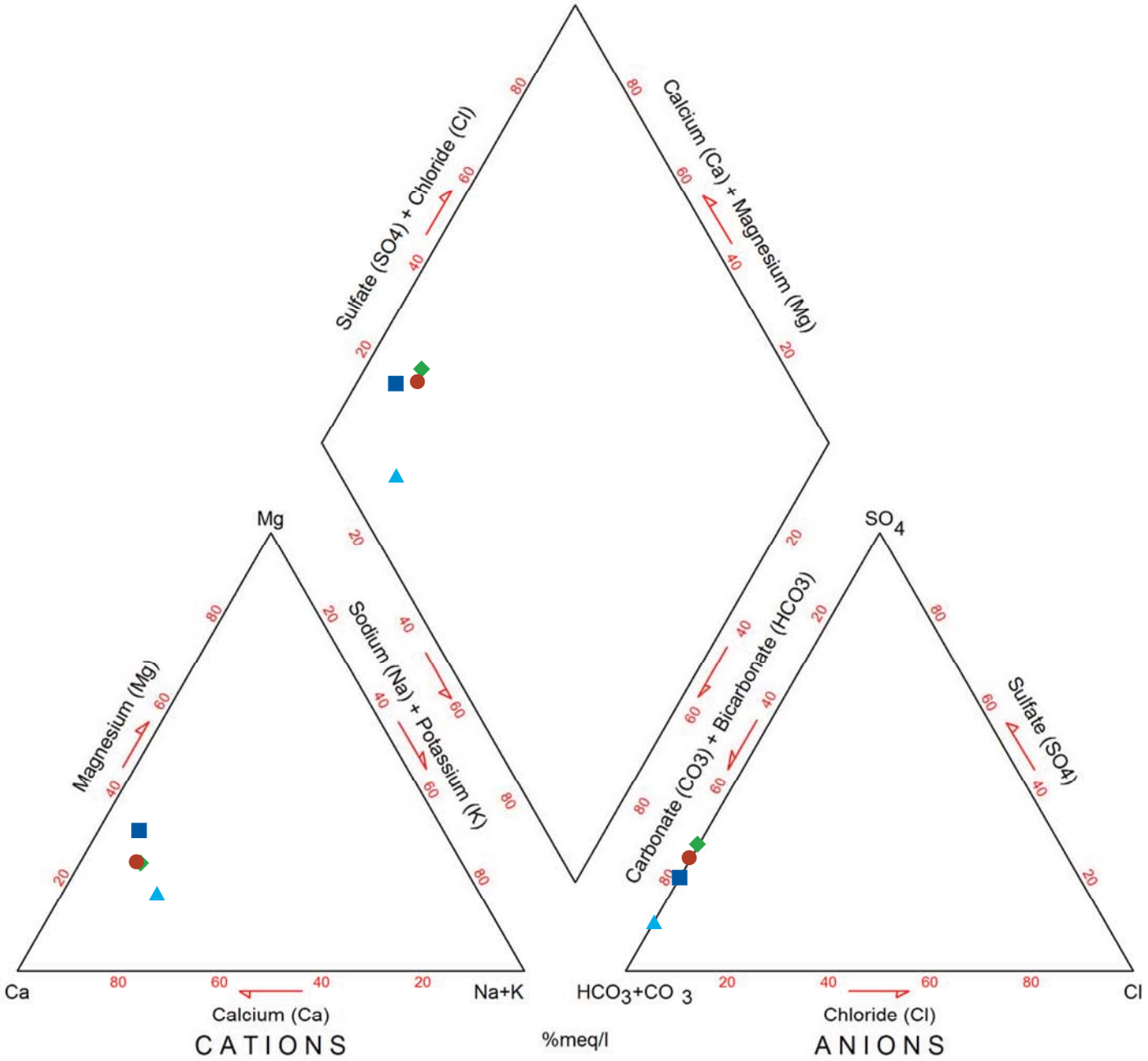

LEGEND

- DARWIN RATHER #1
- DARWIN RATHER #2
- RANCH DURANGO LTD
- RANCH DURANGO NORTH

FIGURE 28
TRI-LINEAR DIAGRAM OF NATURAL SPRINGS WATERS
JUNE 29, 2010
2010 FRUITLAND OUTCROP MONITORING
LA PLATA COUNTY, COLORADO
THE GROUP

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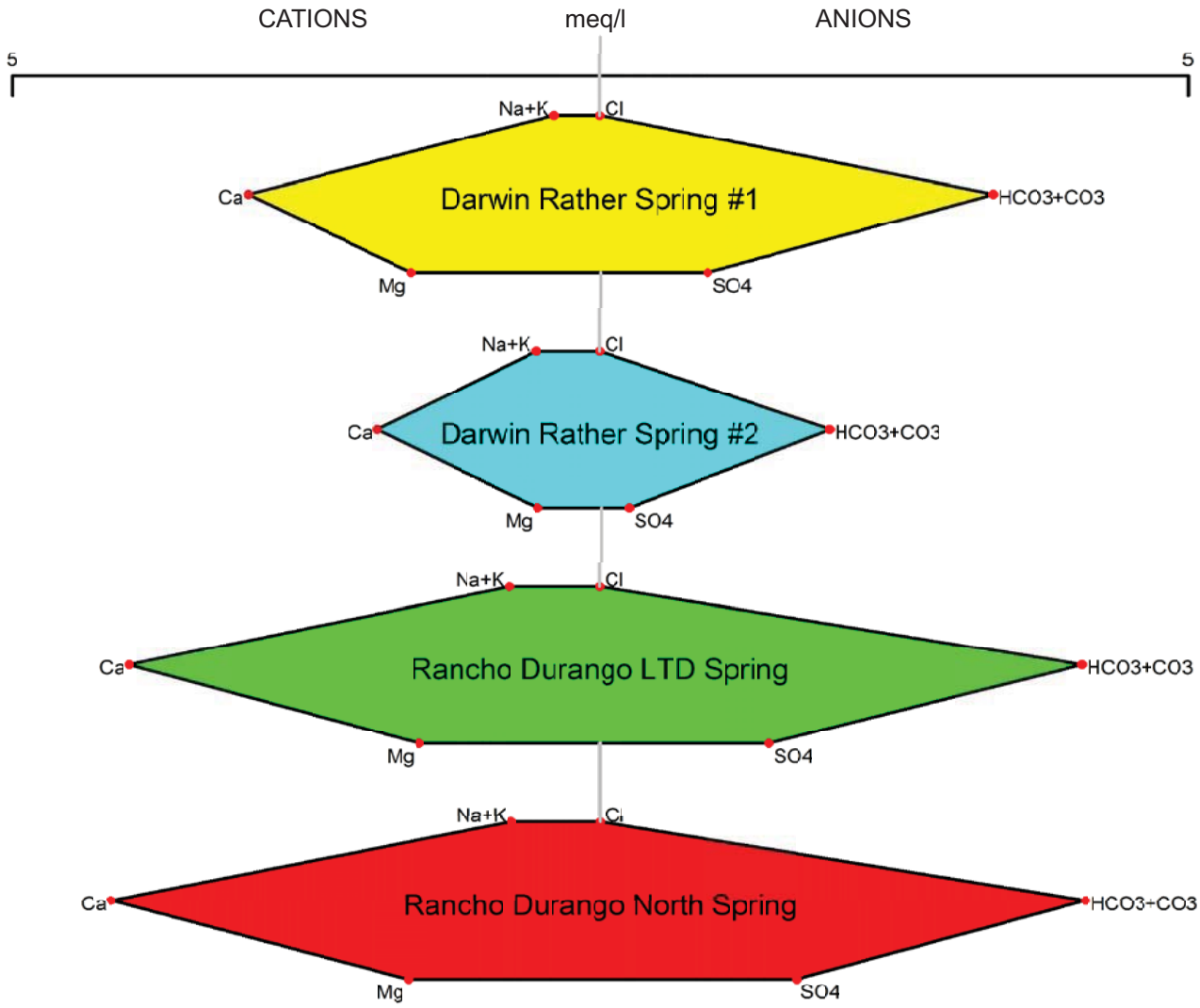

FIGURE 29
STIFF DIAGRAMS
2010 FRUITLAND OUTCROP MONITORING
LA PLATA COUNTY, COLORADO

THE GROUP

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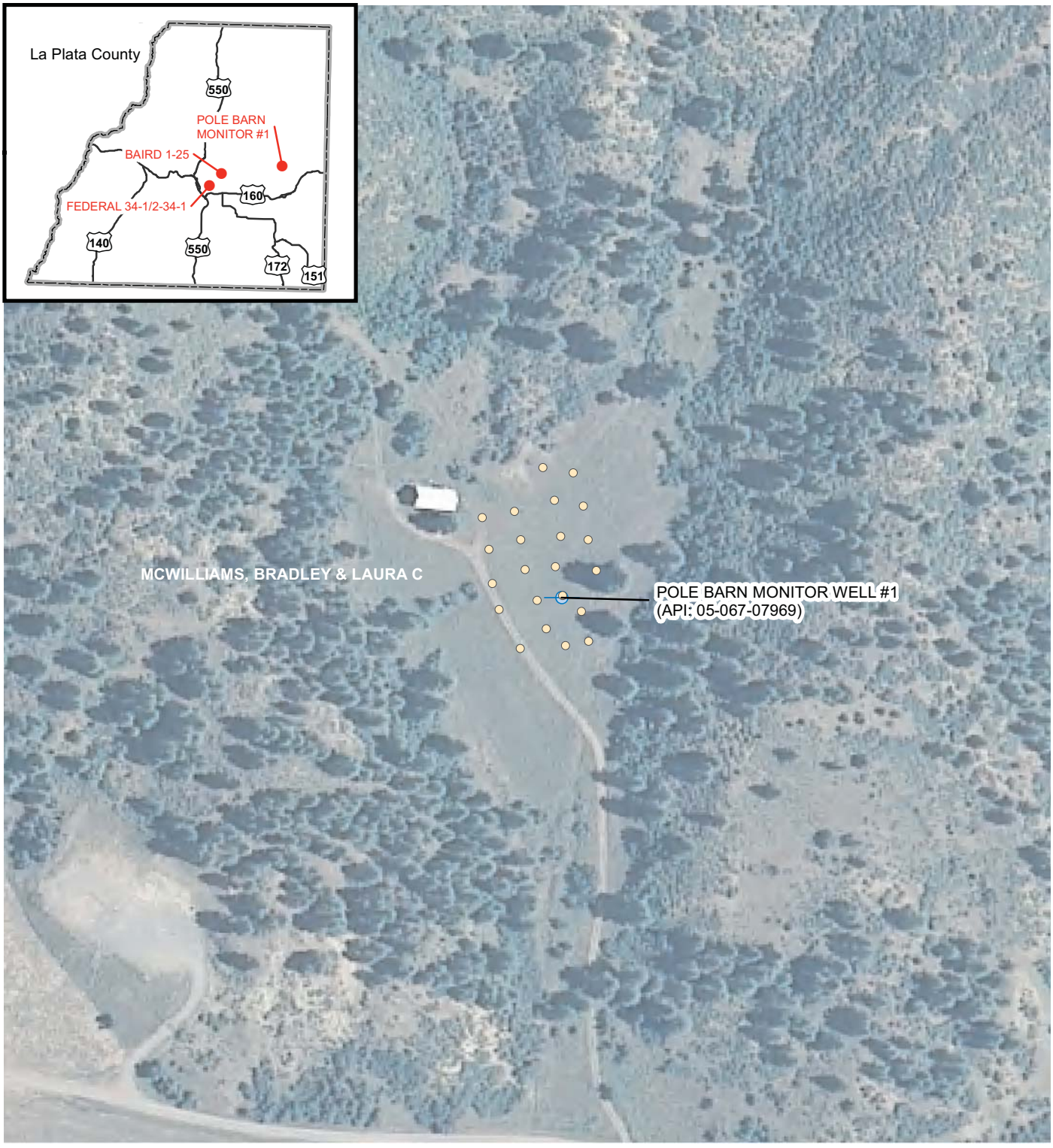

IMAGE COURTESY OF USDA/NRCS, 2009

LEGEND

Methane Flux Measurement (mol/m ^{2} • day)

- 0.0000 - 0.1999
- 0.2000 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 10.0000
- 10.0001 - 50.0000
- 50.0001 - 100.0000
- 100.0001 - 220.0000

mol/m^2 • day - moles per square meter per day
Flux points not labeled are less than 0.2000 mol/m^2 • day Methane

Parcel Boundary & Owner (white)

Shut-In Well Location

0 200
Feet

N

FIGURE 30
METHANE FLUX MEASUREMENTS
POLE BARN MONITOR WELL #1
2010 FRUITLAND OUTCROP MONITORING
LA PLATA COUNTY, COLORADO
THE GROUP

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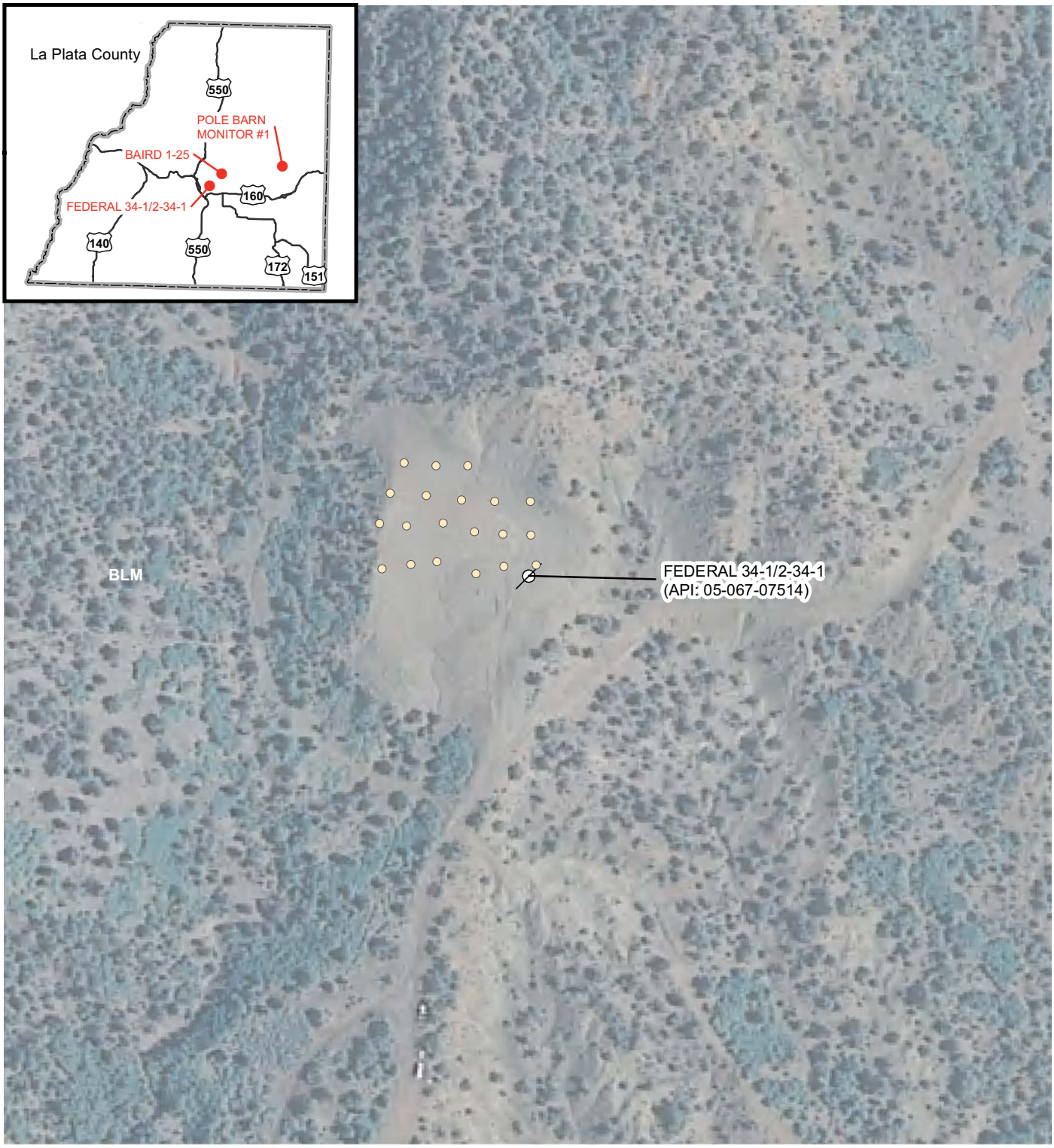


IMAGE COURTESY OF USDA/NRCS, 2009

LEGEND

Methane Flux Measurement (mol/m ^{2} • day)

- 0.0000 - 0.1999
- 0.2000 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 10.0000
- 10.0001 - 50.0000
- 50.0001 - 100.0000
- 100.0001 - 220.0000

mol/m^2 • day - moles per square meter per day
Flux points not labeled are less than 0.2000 mol/m^2 • day Methane

Parcel Boundary & Owner (white)

Abandoned Well Location

0 200
Feet

N

FIGURE 31
METHANE FLUX MEASUREMENTS
FEDERAL 34-1/2-34-1
2010 FRUITLAND OUTCROP MONITORING
LA PLATA COUNTY, COLORADO
THE GROUP

P:\San Juan Basin GIS\LaPlata\Fruitland_OMR\MXDs\Subgas_Flux\2010\2010_05_ABANDONED_WELL.mxd

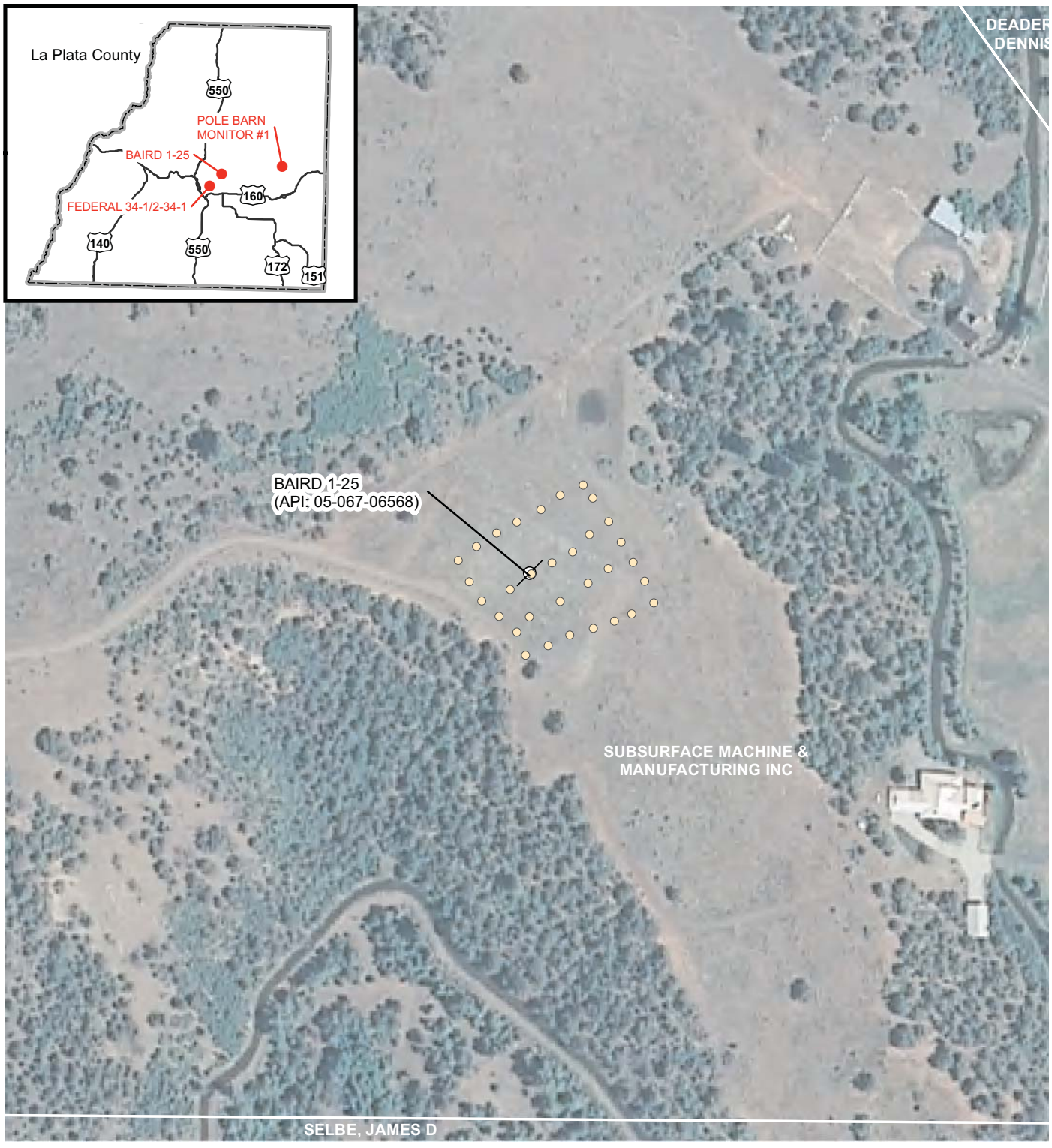


IMAGE COURTESY OF USDA/NRCS, 2009

LEGEND

Methane Flux Measurement (mol/m ^{2} • day)

- 0.0000 - 0.1999
- 0.2000 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 10.0000
- 10.0001 - 50.0000
- 50.0001 - 100.0000
- 100.0001 - 220.0000

mol/m^2 • day - moles per square meter per day
Flux points not labeled are less than 0.2000 mol/m^2 • day Methane

Parcel Boundary & Owner (white)

Abandoned Well Location

0 200
Feet

N

FIGURE 32
METHANE FLUX MEASUREMENTS
BAIRD 1-25
2010 FRUITLAND OUTCROP MONITORING
LA PLATA COUNTY, COLORADO
THE GROUP

P:\San Juan Basin GIS\LaPlata\Fruitland_OMR\MXDs\Subgas_Flux\2010\2010_05_ABANDONED_WELL.mxd

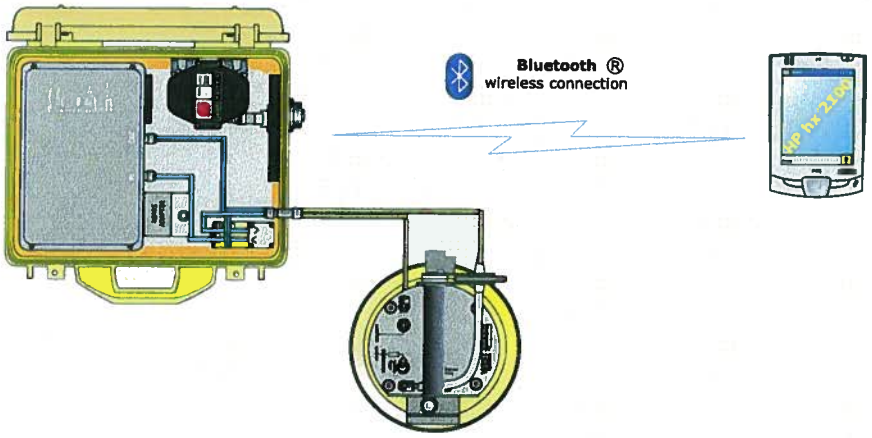
APPENDIX A

EQUIPMENT SPECIFICATIONS

WEST Systems portable soil flux meter

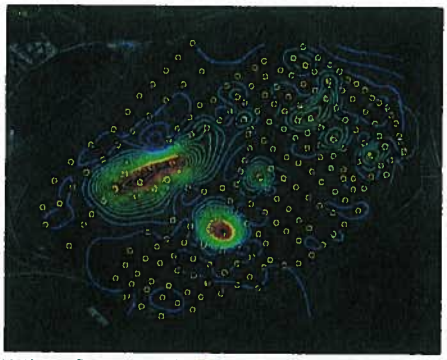
for Carbon dioxide, Methane and Hydrogen sulfide fluxes

The WEST Systems Fluxmeter is a portable instrument for the measurement of soil gas diffuse degassing phenomena that uses the accumulation chamber method.



This method studied for soil respiration in agronomy (Parkinson) and for soil degassing in volcanic areas (R. Cioni et al.), has been designed by WEST Systems to obtain a portable instrument that allows the performance of measurements with very good accuracy in a short time. The instrument allows a wide range evaluation of the amount of soil gas flux and can be utilized for the evaluation of biogas degassing (landfills), for the survey of non visible degassing phenomena in volcanic and geothermal areas as well as soil respiration rate in agronomy. In the picture below, the results of the degassing survey of a landfill.

Portable fluxmeter



Methane flux contour linees

a group of researchers during a flux mapping fieldwork, using the WS-LI820 flux meter

Courtesy of United States Geological Survey

WEST Systems

West Systems Srl
Via Molise 3 - Zona Ind. Gello - 56025 Pontedera (PI) Italy
Phone +39 0587 294216 www.westsystems.com
Fax +39 0587 296068 g.virgili@westsystems.com

Portable soil flux meter

Common physical characteristics:
Total Weight = 8.3 Kg/16 lbs. to be carried on the back using the backpack-like support vest. The field operator will also have to carry one of the accumulation chambers and the palmtop:

Warm Up
Only at instrument cold start-up a warm-up time of 20 minutes is required. The typical measurement time ranges from 2 to 4 minutes and the autonomy of the instrument is about 4 hours with a single NiMH 14.4 Volts, 2.6 A/h battery. The instrument comes with two interchangeable batteries.

Accumulation Chamber specifications:
- Accumulation chamber A diameter : 200 mm / Height: 100 mm / weight: 1.5 Kg/3.3 lbs
- Accumulation chamber B diameter : 200 mm / Height: 200mm / weight : 2.2 Kg /4.84 lbs

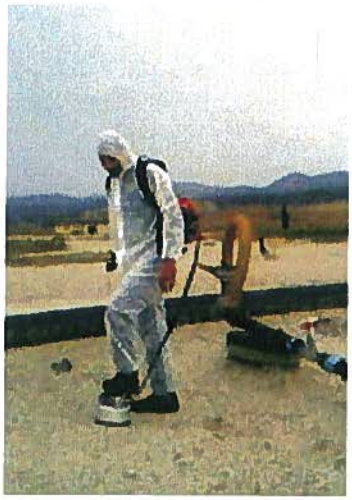
Palm top computer: PocketPC Color Display based on Windows Mobile operating system.
- PalmTop with cables, 0.3 Kg/0.7 lbs.
- Size 125mm (4.8") x 82mm (3.2") * 25 mm (1").

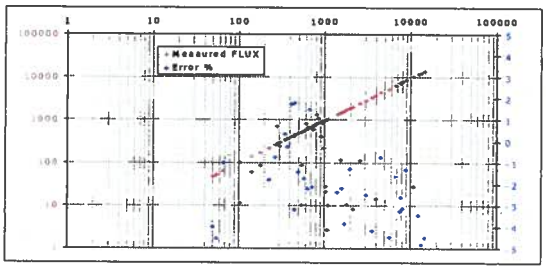
Software The instrument is supplied with a custom software, FluxManager, which allows recording and visualization of the increase in concentration of the target gas in the accumulation chamber, and then the flux calculations. The obtained measurements can be saved on the palmtop computer and then transferred to a desktop PC with a USB connection or using a SD card.

The instrument is supplied complete with:
- backpack-like support vest
- Carrying case for transport and storage
- 2 batteries NiMH 14.4 Volts 2.6 A/h and 1 NiMH battery charger Accumulation chamber A and B
- Palmtop Pocket PC
- User Manual, in English
- FLUX Manager Software for Windows Mobile, in English

The standard flux meter configuration is supplied with a single gas detector, normally the carbon dioxide detector. The fluxmeter can host two sensors by the way special releases, based on specific customer request, it can be supplied with a maximum of 3 sensors.

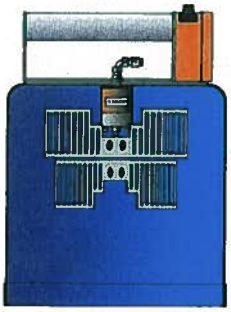
Finally we improved the connection between the instrument and the palmtop that now is based on BlueTooth wireless embedded device.





The measured carbon dioxide flux vs imposed flux (grams m^{-2} day^{-1});
The error % vs imposed flux (in blue).

The instrument is extremely versatile and allows measurement of flux in 2/4 minutes. In the picture: Soil bio-gas flux monitoring in a landifll.



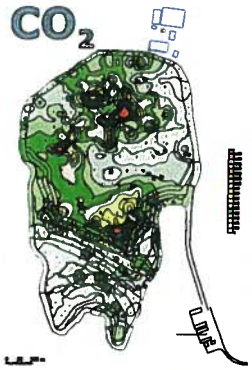
Accumulation Chamber Type B

The accumulation chambers

In the normal use of instrument only the chamber B is used. To extend the instrument sensitivity to very low fluxes the accumulation chamber A is supplied.

	Type A	Type B
net area m^2	0.0314	
net volume m^3	0.003	0.006

WEST Systems
West Systems Srl
Via Molise 3 - Zona Ind. Gello - 56025 Pontedera (PI) Italy
Phone +39 0587 294216 www.westsystems.com
Fax +39 0587 296068 g.virgili@westsystems.com



CO_2 - LI820

LI820 based Carbon dioxide fluxmeter

The CO_2 Fluxmeter is equipped with the LICOR LI-820 the most accurate and reliable portable carbon dioxide detector. The LI-820 is a double beam infrared sensor compensated for temperature variation in the range from -10 to 45°C and for atmospheric pressure variation in the range 660-1060 HPa. Accuracy 2% repeatability ±5ppm. The full scale range can be set to 1000 , 2000, 5000 or 20000 ppmV of carbon dioxide. The characteristics of precision refer to the sensor set to a full scale range of 20000 ppmV. If a very high sensitivity is required, the detector can be set to 1000 or 2000 ppm full scale value to measure with very high precision fluxes in the range from 0 to 10 moles m^{-2} day^{-1}

CO_2 FLUX Measurement range:
from 0 up 600 moles m^{-2} day^{-1}

The accuracy depends on the measured flux:

0 to 0.5 moles m^{-2} day^{-1}	25% (Acc.ch.A)
0.5 to 1 moles m^{-2} day^{-1}	15% (Acc.ch.A or B)
1 to 150 moles m^{-2} day^{-1}	10% (Acc.ch.B)
150 to 300 moles m^{-2} day^{-1}	10% (Acc.ch.B)
300 to 600 moles m^{-2} day^{-1}	20% (Acc.ch.B)

WS-DRAGER CO_2

WS-DRAGER: CO_2 Flux measurement:

A double beam infrared sensor compensated for temperature variation in the range from -20 to 65°C. Accuracy 3%. The full scale value can be set from 2,000 to 300,000 ppm of carbon dioxide. Carbon Dioxide flux measurement range from 0.5 to 1500 moles/m^2 per day.

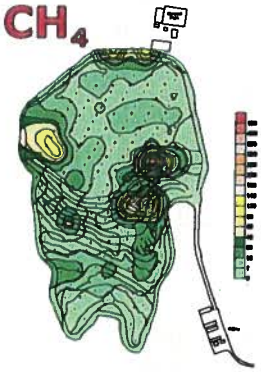
The precision depends on the measured flux:

range:0.5 – 5 moles/m^2 per day 25% (Acc. chamber A)

5-350 moles/m^2/day 10% (Acc. chamber B)

350-600 moles/ m^2/day 25% (Acc. chamber B)

600-1500 moles/ m^2/day 25% (Acc.Ch.B / F.S.=10%)



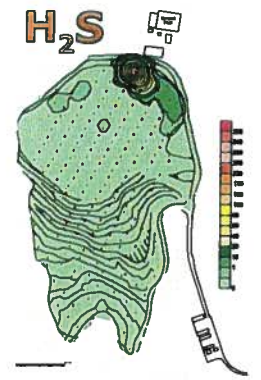
WS-HC CH^4

Methane fluxmeter

The methane sensor is an IR spectrometer. The full-scale range is 50000ppm, accuracy of 5% of reading, and repeatability is 2% of span. Detection limit 60 ppm, resolution 22 ppm. The detector was designed to measure the not controlled emissions of landfill, but it can be used to detect methane emission from coal or wherever the 0.2 moles/m^2/day detection limit is acceptable.

Methane Flux measurement range
from 0.2 up 300 moles m^{-2} day^{-1}
The fluxmeter is provided with 2 accumulation chambers and the accuracy depends on the measured flux:

0.2 to 10 moles m^{-2} day^{-1}	25% (Acc.Ch.A)
10 to 150 moles m^{-2} day^{-1}	15% (Acc.Ch.A)
150 to 300 moles m^{-2} day^{-1}	20% (Acc.Ch.B)



H_2S - WEST

Hydrogen sulfide

The hydrogen sulphide detector is a electrochemical cell with the following specifications:
The full-scale range is 20ppm, with a precision of 3% of reading, and the repeatability is 1.5% of span with a zero offset of 0.3%.

H_2S Flux measurement range: from 0.0025 to 0.5 moles/m^2 per day.
The precision depends on the measured flux:
0.0025 – 0.05 moles/m^2 per day ±25% (Acc. Chamber A)
0.05 – 0.5 moles/m^2 per day ±10% (Acc. Chamber B)

NOTE: The hydrogen sulphide flux evaluation can be affected by the presence of large quantities of water in both liquid and vapour phases.

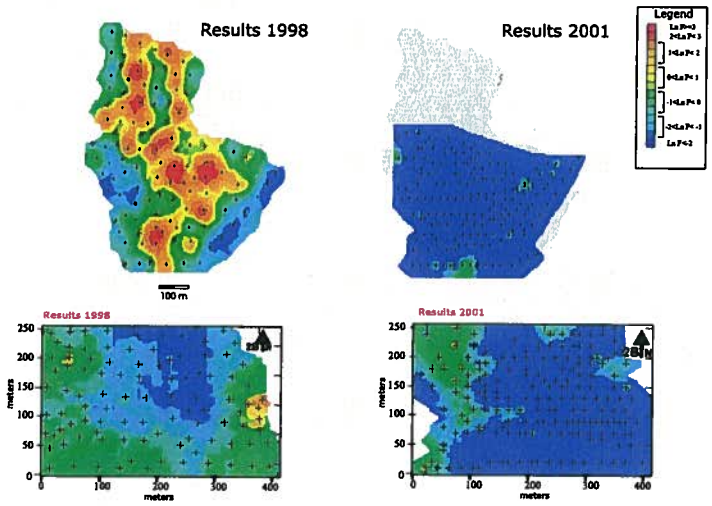
We thanks to N.Lima et al. for the maps.

WEST Systems

West Systems Srl
Via Molise 3 - Zona Ind. Gello - 56025 Pontedera (PI) Italy
Phone +39 0587 294216 www.westsystems.com
Fax +39 0587 296068 g.virgili@westsystems.com

Application on a landfill: mapping the biogas non controlled emissions.

The figure shows the compare between the results of the measurement regime of a land/fill undertaken in 1998 and 2001: the mapping performed in 1998 gave clear indications of the areas which required intervention to improve the cover and the capture system.
The interventions were performed only where necessary with a significant economic savings.
The measurement regime of 2001 indicates without any doubt that the intervensions were efficient and state-of-the-art.



The obtained results:

- Minor atmospheric emissions;
- Higher quantity and better quality of biogas for cogeneration;
- Optimisation of management costs.

Continuous soil flux monitoring

WEST Systems produces a soil gas station for the continuous monitoring of carbon dioxide and hydrogen sulfide flux, soil temperature , soil water content, soil pressure gradient, soil heat flux and meteorological parameters.
For more information contact your local representative, visit our web site or e-mail to: g.virgili@westsystems.com

Local sales representative

H.Q.

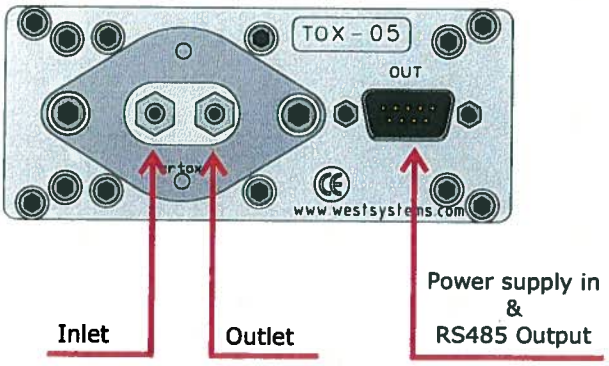
West Systems Srl
Via Molise 3 - Zona Ind. Gello - 56025 Pontedera (PI) Italy
Phone +39 0587 294216 www.westsystems.com (or .it)
Fax +39 0587 296068 g.virgili@westsystems.com (or .it)

Japan

SHOKO CO., LTD.
7-13,1-chome, Shibakoen, Minato-ku Tokyo
105-8432, Japan
TEL : 03-3459-5106 FAX : 03-3459-5081
WEB SITE http://www.shoko.co.jp
e-mail s-isotope@shoko.co.jp

WEST Systems
West Systems Srl
Via Molise 3 - Zona Ind. Gello - 56025 Pontedera (PI) Italy
Phone +39 0587 294216 www.westsystems.com
Fax +39 0587 296068 g.virgili@westsystems.com

Hydrogen Sulfide Detector



Pin	Signal
1	Gnd
2	+VDC
3	Gnd
4	RS485-B
5	RS485-A
6	Gnd
7	+12V
8	Gnd
9	RS485-B

Legenda
Gnd: Ground reference for power supply and RS485
+VDC: 10-28 Volts Power supply input
RS485-A: Digital signal output A
RS485-B: Digital signal output B

Sensor specifications
Ambient conditions:
Air temperature -40°C to 65 °C
Air pressure 700 hPa to 1300 hPa
Air RH 5% - 95% non condensating.
Expected sensor life > 24 months.
Chemical cell order code: WEST H2S-BH
Detector order code: WEST TOX-05-H2S-BH
Factory calibration : 20 ppm
RMS Noise <= 0.02 ppm
Zero Offset <= 0.2 ppm
Max Overrange >= 200 ppm

The chemical cell reaction is:

$$H_2S + 2O_2 = H_2SO_4$$

the gas sample specific consuption is very low:

2.5×10^{-10} moles/Sec per ppm

Due to this consuption the H2S flux is methodically understimated by a -10% with the AccumulationChamber A and by a -5% when using the accumulation chamber B. Then we advise to use the accumulation chamber B except when the flux is very very low.

Appendix M

WS-HC detector

WS-HC Hydrocarbon Flux measurement:
The HydroCarbon detector is based on a double beam infrared spectrometer able to detect methane, hexane , propane and other molecules with HC linkages. The instrument comes calibrated for the methane. *The instrument requires a frequent **zero base-line** calibration that will be done using atmospheric air. The calibration requires 20 second.*

Detector specifications:

Accuracy 5%

Repeatibility 2%

Resolution 22 ppm (Methane equivalent)

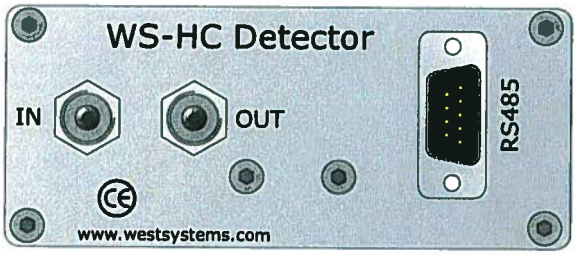
Full scale range is 50000 ppm of methane.

Detection limit 60 ppm.

Methane flux measurement range from 0.1 to 150 moles/m^2 per day.
The precision depends on the measured flux:

```
range 0.1  5      moles/ m^2 per day ±25%
      5 - 150     moles/ m^2 per day ±10%
```

The measurement of very low fluxes (< 0.1 moles/m^2/day) is possible but the error will increase due to the low detector sensitivity.



RS485 Connector DB9 Male panel

Pin 1	**Gnd**
Pin 2	**+Power supply**
Pin 3	**Gnd**
Pin 4	**RS485 B**
Pin 5	**RS485 A**
Pin 6	**Gnd**
Pin 7	**+Power supply**
Pin 8	**Gnd**
Pin 9	**RS485 B**

The gas fittings can be used with rilsan 6x4 mm tubes or silicon 5x3.2 tubes. Please respect inlet and outlet ports.

LI-820 Specifications

CO_2 Specifications

Measurement Range: 0-1000 ppm, 0-2000 ppm with 14 cm bench; 0-5000 ppm, 0-20000 ppm with 5 cm bench

Accuracy: < 2.5% of reading with 14 cm bench; 4% of reading with 5 cm bench

Calibration Drift

[1]Zero Drift: < 0.15 ppm / °C

[2]Span Drift at 370 ppm: < 0.03% / °C

[3]Total Drift at 370 ppm: <0.4 ppm / °C

RMS Noise at 370 ppm with 1 sec Signal Filtering: < 1 ppm

[1] Zero drift is the change with temperature at 0 concentration
[2] Span drift is the change after re-zeroing following a temperature change
[3] Total drift is the change with temperature without re-zeroing or re-spanning

Measurement Principle: Non-Dispersive Infrared

Traceability: Traceable gases to WMO standards from 0-3000 ppm. Traceable gases to EPA protocol gases from 3000 to 20000 ppm

Pressure Compensation Range: 15 kPa-115 kPa

Maximum Gas Flow Rate: 1 liter/minute

Output Signals: Two Analog Voltage (0-2.5 V or 0-5 V) and Two Current (4-20 mA)
Digital: TTL (0-5 V) or Open Collector

DAC Resolution: 14-bits across user-specified range

Source Life: 18000 hours

Power Requirements: Input Voltage 12-30 VDC
1.2A @ 12V (14 W) maximum during warm-up with heaters on
0.3 A @ 12 V (3.6 W) average after warm-up with heaters on

Supply Operating Range: 12-30 VDC

Operating Temperature Range: -20 to 45 °C

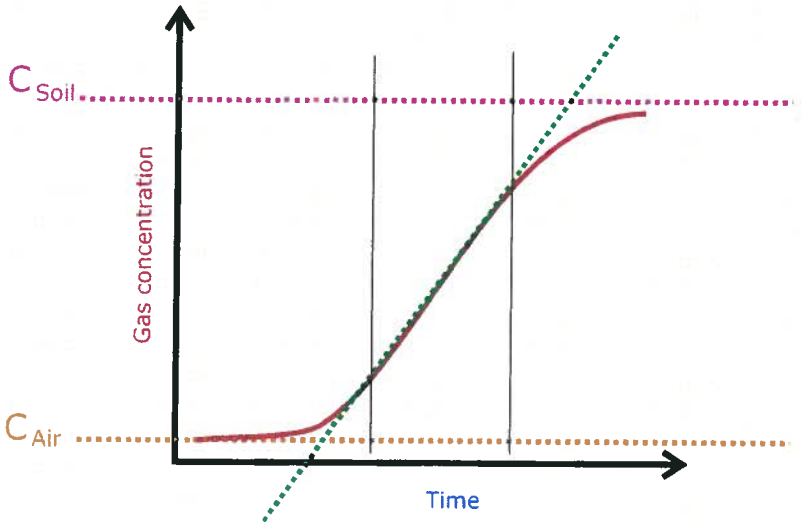
Relative Humidity Range: 0 to 95% RH, Non-Condensing

Dimensions: 8.75" x 6" x 3" (22.23 x 15.25 x 7.62 cm)

Weight: 2.2 lbs (1 kg)

Quantifying the flux

How explained in the chapter 3 the flux is proportional to the concentration increase ratio ppm/sec. The proportionality factor depends on the chamber volume/surface ratio as well as the barometric pressure and the air temperature inside the accumulation chamber.



There are two methods to carry out the field work, in both cases for each measurement you have to record the type of accumulation chamber used, the barometric pressure, and the air temperature.
The variation of few mBar of the pressure and or few degrees of temperature do not affect the evaluation of flux very much, then you can use a mean value for both parameters. Of course that depends on the accuracy you want to reach for the evaluation of flux.
The instrument measures the barometric pressure, using the embedded pressure sensor of the LICOR, with a good accuracy. A platinum Pt100 or a thermo-couple thermometer can be used to measure the air temperature as well as the soil temperature.

Choosing the flux measurement unit

The first measurements made, 10 years ago, with the accumulation chamber was expressed in cm/sec which is a speed, the speed of carbon dioxide flowing out from the soil. During the last ten years several units have been used by volcanologist and by geochemistry researchers. The most common unit is grams/squaremeter per day, but using the same instrument for two gas species to express the flux using this unit means to have two different conversion factors. Actually we use the unit **moles/squaremeter per day** that has two advantages: A single conversion factor for every gas specie and an easy conversion of the flux in grams/sm per day simply multiplying the result expressed in moles/sm per day for the molecular weight of the target gas.

From the [tools][settings] menu you can set the accumulation chamber factor in the "A.c.K." field.

If this factor is set to 1 the instrument will give you results expressed in ppm/sec, that's simply the slope of the curve in the selected interval.

If you set the A.c.K to a value different from 1 the instrument will give you the results expressed in moles per square meter per day.

Please see next page.

Quantifying the flux

Method 1: Measuring the slope

Set the Accumulation Chamber factor to 1 in order to have the flux measurement expressed in the slope unit "ppm/sec" and translate it in the desired unit with a post processing.
Using this method you can focus only on the accumulation chamber interfacing with the soil, the flux curve shape and the other aspects of the measurement, putting off choosing the correct accumulation chamber factor.

Method 2: Measuring the flux directly in moles/sm/day.

To get the results directly in moles/sm/day you have to set the Accumulation Chamber factor to the correct value, taking it from the tables.
For each measurement, if there are variations in the air temperature, or of the barometric pressure, or if you changed the accumulation chamber you have to select the [tools][settings] menu and put the correct accumulation chamber factor in the "A.c.K." field. This operation can be "critical". In any case on the saved files you'll find the results of flux evaluation expressed in both units , the raw ppm/sec and the moles/sm/day computed with the A.c.K. you set.

The accumulation chamber factors

Here following the formula used to compute the A.c.K.:

$$K = \frac{86400 \cdot P}{10^6 \cdot R \cdot T_k} \cdot \frac{V}{A}$$

Where

- **P** is the barometric pressure expressed in mBar (HPa)
- **R** is the gas constant 0.08314510 bar L K^{-1} mol^{-1}
- **T_k** is the air temperature expressed in Kelvin degree
- **V** is the chamber net volume in cubic meters
- **A** is the chamber inlet net area in square meters.

The dimensions of the A.c.K. are

$$K = \frac{moles \cdot meter^{-2} \cdot day^{-1}}{ppm \cdot sec^{-1}}$$

In the table the conversion factors vs temperaure and barometric pressure for the Accumulation Chamber Type A and B are reported.

An example:

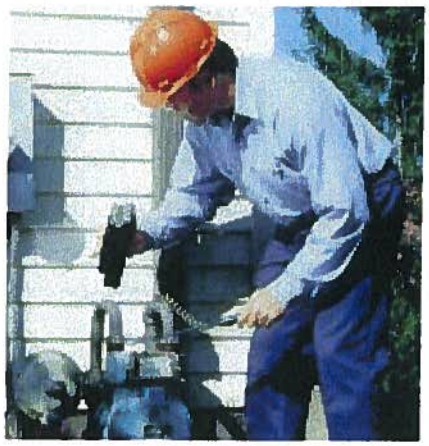
You're using the accumulation chamber B, the slope of the flux curve is 2.5 ppm/sec, the barometric pressure is 1008 mBar (HPa) and the air temperature is 22 °C.
From the table B get the value that correspond to the barometric pressure and temperature. In this case I get the value computed for 25°C and 1013 mBar : 0.696.

Then the flux is: 2.5 x 0.696= 1.74 moles per square meter per day.

Gasport® Gas Tester

MSA

The Gasport Gas Tester is designed for gas utility workers to detect methane and certain toxic gases. It is a reliable, simple, versatile tool to help your service technicians get the job done quickly! With multiple ranges and sensing capabilities built into one rugged housing, the Gasport Tester simplifies your work by reducing the number of meters you have to carry on the job.



Applications

The Gasport Tester's poison-tolerant methane sensor provides three measurement ranges for your daily service needs:

- Open air, safety sampling
- Small, in-home leak detection
- Street/outdoor service line leak detection

Features and Benefits

- **Proven in field use–rugged and reliable**
  Less costly to maintain, less time in repair
- **Multiple functions in one instrument**
  No need to buy, carry & maintain multiple instruments
- **New, poison-tolerant combustible gas sensor**
  Reduces meter ownership costs
- **User-selectable, "silent" operation mode**
  Reduces customer disturbances and worries
- **Fast warm up time**
  Fastest warm up time in industry saves time
- **Can monitor up to four gases at a time**
  Fewer instruments to carry
- **Show all gas concentrations simultaneously**
  Eliminates guesswork on what reading is displayed
- **Autoranging methane sensor**
  Automatically switches between 0-5% and 5-100% methane ranges
- **Gas readings recorded for later retrieval**
  Can double check readings after job is done
- **Simple manual or automated calibration options**
  Reduces training time and helps ensure accuracy
- **Intrinsically safe**
  Meets safety standards for work in hazardous areas
- **Lifetime warranty on case and electronics**
  Reduced maintenance and lifetime costs

Specifications

Gas	Range	Resolution
Methane	0–5000 ppm	50 ppm
Methane	0–100% LEL or 0–5% CH_4	1 % LEL or 0.1% CH_4
Methane	5–100% CH_4	1% CH_4
Oxygen	0–25%	0.1%
Carbon Monoxide	0–1000 ppm	1 ppm
Hydrogen Sulfide	0–100 ppm	1 ppm

Battery types: NiCd and Alkaline
Case material: Impact resistant, stainless-steel-fiber-filled polycarbonate
Operating temperature: normal -10 to 40°C; extended -20 to 50°C
Operating humidity: Continuous: 15-95% RH, non-condensing
Intermittent duty: 5-95% RH, non condensing
Warm up time: Less than 20 seconds to initial readings
Datalog capacity: 12 hours
Input: 3 clearly marked, metal domed keys
Warranty: Case and Electronics: Lifetime
Sensors and consumable parts: 1 year

The answer for gas utilities' gas detection needs

Gasport® Gas Tester

Ordering Information

Battery Chargers

Part No.	Description
494716	Omega 120 VAC 50/60Hz
495965	Omega 220 VAC 50/60Hz
801759	Omega 110/220 VAC, Five Unit, 50/60Hz
800525	Omega 8 - 24VDC for vehicle use

Battery Packs

Part No.	Description
496990	Standard NiCd Rechargeable
800526	Alkaline, Type C
711041	Alkaline, with Thumbscrews
800527	Heavy Duty NiCd Rechargeable

Sensors

Part No.	Description
813693	Combustible Gas
480566	O_2
812389	CO
812390	H_2S

Protective Boots

Part No.	Description
804955	Black, for NiCd Battery Packs
802806	Orange, for NiCd Battery Packs
806751	Black, for Alkaline Battery Packs
806750	Orange, for Alkaline Battery Packs
806749	Black, for HD NiCd Battery Packs
806748	Orange, for HD NiCd Battery Packs
812833	Yellow Soft Carrying Case with Harness
711022	Black padded Vinyl Carrying Case with Harness

Sampling Equipment

Part No.	Description
800332	Probe - 1 ft., plastic
800333	Probe - 3 ft., plastic
803561	Probe - 3 ft., plastic (holes 2" from end) (bar hole probe)
803962	Probe - 3 ft., plastic (holes 2" from handle) (solid probe)
803848	Probe - Hot Gas Sampler
710465	Sampling Line - 5 ft., coiled
497333	Sampling Line - 10 ft.
497334	Sampling Line - 15 ft.
497335	Sampling Line - 25 ft.

Sampling Accessories

Part No.	Description
801582	Replacement Filter, Probe, pkg. of 10
801291	External Filter Holder
014318	Charcoal Filter
711039	Line Scrubber Filter Holder
711059	Line Scrubber Replacement Cartridges, Box of 12
808935	Dust Filter, Pump Module
802897	Water Trap (Teflon) Filter, Pump Module

Calibration Check Equipment

Part No.	Description
477149	Calibration Kit Model RP with 0.25 lpm Regulator
491041	Calibration Gas - methane, 2.5%
473180	Calibration Gas - 300 ppm CO
813718	Calibration Gas - methane, 2.5% oxygen, 15%60 ppm CO
813720	Calibration Gas - methane, 2.5% oxygen, 15%300 ppm CO 10 ppm H_2S
710288	Gasmiser™ Demand Regulator 0 - 3.0 lpm

Accessories

Part No.	Description
804679	Data Docking Module Kit. Includes the Data Docking Module, MSA Link Software and Instruction Manual

Approvals

The Gasport Gas Tester has been designed to meet intrinsic safety testing requirements in certain hazardous atmospheres.

The Gasport Gas Tester is approved by MET (an OSHA Nationally Recognized Testing Laboratory [NRTL]) for use in Class I, Division I, Groups A, B, C, D; Class II, Division I, Groups E, F, G; and Class III Hazardous locations. Gaspor tGas Testers sold in Canada are approved by CSA for use in Class I, Division I, Groups A, B, C, and D locations.

Contact MSA at 1-800-MSA-2222 for more information or with questions regarding the status of approvals.

Gasport Gas Tester Kits

	LEL Display	O_2	CO	H_2S	Alarms Always	Alarms Optional	Leak Detect Page	Peak	Alkaline Battery	NiCd Battery	5ft Coiled Line	1ft Probe	Part No.
4-Gas, Selectable, NiCd	•	•	•	•		•	•	•		•	•	•	711489
4-Gas, Selectable, Alkaline	•	•	•	•		•	•	•	•		•	•	711490
3-Gas, Selectable, NiCd	•	•	•			•	•	•		•	•	•	711493
3-Gas, Selectable, Alkaline	•	•	•			•	•	•	•		•	•	711494
2-Gas, Selectable, NiCd	•		•			•	•	•		•	•	•	711495
2-Gas, Selectable, Alkaline	•		•			•	•	•	•		•	•	711496
4-Gas, Alarms On, NiCd	•	•	•	•	•		•	•		•	•	•	711491
4-Gas, Alarms On, Alkaline	•	•	•	•	•		•	•	•		•	•	711492

Assemble-to-Order (ATO) System: You Make the Choices

The ATO System makes it easy to "custom order" the Gasport Gas Tester, configured exactly the way you want it. You can choose from an extensive line of base instrument components and accessories. To obtain a copy of the "ATO System and Price Information for the Gasport Gas Tester," call toll-free 1-800-MSA-2222, and request Bulletin 0804-28. **To obtain a copy of the ATO via FAX, call MSA QuickLit Information Service at 1-800-672-9010. At the prompt, request QuickLit Document #2345 (ATO for Gasport Gas Tester).**

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Corporate Headquarters
P.O. Box 426
Pittsburgh, PA 15230 USA
Phone (412) 967-3000
www.MSAnet.com

U.S. Customer Service Center
1-800-MSA-2222

MSA International
Phone (412) 967-3354
FAX (412) 967-3451

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The total GPS platform for all your GIS field requirements

The GeoXT™ handheld, from the GeoExplorer® series, is an essential tool for maintaining your GIS. It's all you need to collect location data, keep existing GIS information up to date, and even mobilize your GIS.

The unique GeoExplorer series combines a Trimble® GPS receiver with a rugged field-ready handheld computer running the Microsoft® Windows Mobile™ 2003 software for Pocket PCs. Plus there's an internal battery that easily lasts for a whole day of GPS operation. The result is tightly integrated, tough, and incredibly powerful.

High-accuracy integrated GPS

The GeoXT is optimized to provide the reliable, high-accuracy location data you need. Advanced features like EVEREST™ multipath rejection technology let you work under canopy, in urban canyons, or anywhere where accuracy is crucial.

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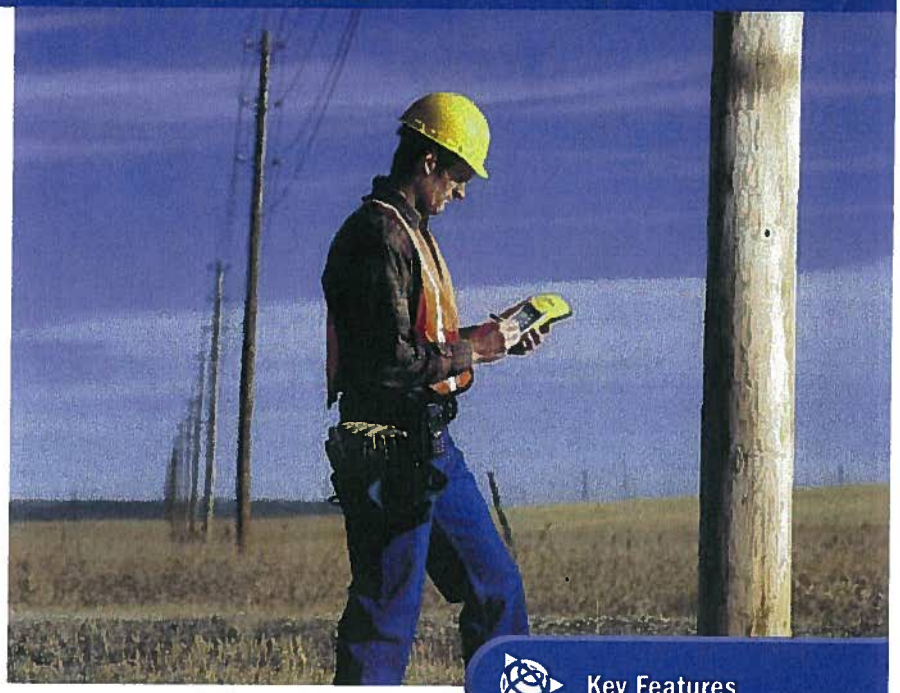
All the memory you need

There's plenty of storage space in the GeoXT for all your GIS data. The fast processor and large memory mean even big graphics files load quickly—and they're crisp and crystal-clear on the advanced TFT outdoor color screen.



Key Features

- High-performance submeter GPS with integrated WAAS/EGNOS
- Windows Mobile 2003 software for Pocket PCs, allowing maximum flexibility in software choice
- Rugged handheld with all-day battery
- Advanced color TFT display with backlight
- Integrated Bluetooth for wireless connectivity

From data collection to data maintenance, to mobile GIS and beyond ... the GeoXT is the handheld of choice.

* *Bluetooth type approvals are country specific. GeoExplorer series handhelds are approved for use with Bluetooth in the USA. For a complete list of other countries with Bluetooth approval please refer to: www.trimble.com/geo_bluetooth.html.*

** *Microsoft Streets & Trips 2004 software available in US/Canada; Microsoft AutoRoute® 2004 in Europe.*

Trimble.

GeoXT

The total GPS platform for all your GIS field requirements

Standard features

System
- Microsoft Windows Mobile 2003 software for Pocket PCs
- 206 MHz Intel StrongARM processor
- 512 MB non-volatile Flash data storage
- Outdoor color display
- Ergonomic cable-free handheld
- Rugged and water-resistant design
- All-day internally rechargeable battery
- Bluetooth wireless

GPS
- Submeter accuracy
- Integrated WAAS[1]/EGNOS[2]
- RTCM real-time correction support
- NMEA and TSIP protocol support
- EVEREST multipath rejection technology

Software
- GPS Controller for control of integrated GPS and in-field mission planning
- GPS Connector for connecting integrated GPS to external ports
- File Explorer, Internet Explorer, Pocket Outlook (Inbox, Calendar, Contacts, Tasks, Notes), Sprite Pocket Backup, Transcriber, Pocket Word, Pocket Excel, Pictures, Windows® Media Player, Bluetooth File Transfer, Calculator, ActiveSync®
- Microsoft Streets & Trips/AutoRoute 2004 software

Accessories
- Support module with power supply and USB data cable
- Getting Started Guide
- Companion CD includes Outlook 2002 and ActiveSync 3.7.1
- Hand strap
- Pouch
- Stylus

Optional Features

Software
- TerraSync
- GPScorrect for ESRI® ArcPad®
- GPS Pathfinder® Tools Software Development Kit (SDK)
- GPS Pathfinder Office
- Trimble GPS Analyst extension for ArcGIS®

Accessories
- Serial clip for field data and power input
- Vehicle power adaptor[3]
- Portable power kit[3]
- Hurricane antenna
- External patch antenna
- Pole-mountable ground plane
- Baseball cap with antenna sleeve
- Beacon-on-a-Belt (BoB™) differential correction receiver[3]
- Hard carry case
- Null modem cable[3]
- Backpack kit

Specifications subject to change without notice.

Technical specifications

Physical

Size	21.5 cm × 9.9 cm × 7.7 cm (8.5 in × 3.9 in × 3.0 in)
Weight	0.72 kg (1.59 lb) with battery
Processor	206 MHz Intel StrongARM SA-1110
Memory	64 MB RAM and 512 MB internal Flash disk
Power	
Low (no GPS)	0.6 Watts
Normal (with GPS)	1.4 Watts
High (with GPS, backlight, and Bluetooth)	2.5 Watts
Battery	Internal lithium-ion, rapidly rechargeable in unit, 21 Watt-hours

Environmental

Temperature	
Operating	-10 °C to +50 °C (14 °F to 122 °F)
Storage	-20 °C to +70 °C (-4 °F to 158 °F)
Humidity	99% non-condensing
Casing	Wind-driven rain and dust-resistant per IP 54 standard Slip-resistant grip, shock- and vibration-resistant

Input/output

Communications	Bluetooth for wireless connectivity USB vie support module, serial via optional DE9 serial clip adaptor
Bluetooth	
Certification	Bluetooth type approvals are country specific. GeoExplorer series handhelds are approved for use with Bluetooth in the USA. For a complete list of other countries with Bluetooth approval please refer to www.trimble.com/geoxt_ts.asp.
Profiles	
Both client and host support	Serial Port, File Transfer (using OBEX)
Client support only	Dial-Up Networking, Lan Access
Host support only	Basic Imaging, Object Push
Display	Advanced outdoor TFT, 240 × 320 pixel, 65,536 colors, with backlight
Audio	Microphone and half duplex speaker, record and playback utilities
Interface	Anti-glare coated touch screen, Soft Input Panel (SIP) virtual keyboard 2 hardware control keys plus 4 programmable permanent touch buttons Handwriting recognition software, Audio system events, warnings, and notifications

GPS

Channels	12
Integrated real-time	WAAS[1] or EGNOS[2]
Update rate	1 Hz
Time to first fix	30 sec (typical)
Protocols	NMEA (GGA, VTG, GLL, GSA, ZDA, GSV, RMC), TSIP (Trimble Standard Interface Protocol)

Accuracy (RMS)[4] after differential correction

Postprocessed[5]	Submeter
Carrier postprocessed[6]	
With 10 minutes tracking satellites	30 cm
Real-time	Submeter

1 *WAAS (Wide Area Augmentation System). Available in North America only. For more information, see http://gps.faa.gov/programs/index.htm.*
2 *EGNOS (European Geostationary Navigation Overlay System). Available in Europe only. For more information, see http://www.esa.int/export/esaSA/navigation.html.*
3 *Serial clip also required.*
4 *Horizontal accuracy. Requires data to be collected with minimum of 4 satellites, maximum PDOP of 6, minimum SNR of 4, minimum elevation of 15 degrees, and reasonable multipath conditions. Ionospheric conditions, multipath signals or obstruction of the sky by buildings or heavy tree canopy may degrade precision by interfering with signal reception. Accuracy varies with proximity to base station by +1 ppm for postprocessing and real-time, and by +5 ppm for carrier postprocessing.*
5 *Postprocessing with GPS Pathfinder Office software or GPS Analyst extension for ArcGIS.*
6 *Requires collection of carrier data. (Only available with the GPS Pathfinder Office software).*

YOUR LOCAL TRIMBLE OFFICE OR REPRESENTATIVE

www.trimble.com

NORTH & SOUTH AMERICA
Trimble Navigation Limited
7403 Church Ranch Blvd • Suite 100
Westminster, CO 80021 • USA
+1-720-887-4374 Phone • +1-720-887-8019 Fax

EUROPE, AFRICA & MIDDLE EAST
Trimble GmbH
Am Prime Parc 11 • 65479 Raunheim • GERMANY
+49-6142-2100-0 Phone • +49-6142-2100-550 Fax

ASIA-PACIFIC
Trimble Navigation Australia Pty. Ltd
Level 1 • 123 Gotha St • Fortitude Valley
Queensland 4006 • AUSTRALIA
+61-7-3216-0044 Phone • +61-7-3216-0088 Fax

ULTRAMETER II™

OVER 50 YEARS

MYRON L COMPANY

Water Quality Instrumentation

Accuracy • Reliability • Simplicity

ULTRAMETER II™

Advanced Design • Superior Performance

MADE IN USA

OVER 50 YEARS

pH/ORP Sensor protective cap

Four-digit display for full 9999 readings, with autoranging capability up to 200 mS/200 ppt

Powerful microprocessor based surface-mount circuitry

Display prompts for simple pH calibration

Memory for 100 readings with Date & Time Stamp

Real Time Clock

Factory calibrations stored in microprocessor

Conductivity

Resistivity

TDS

Temperature

pH

ORP

CE

ULTRA-FAST
ULTRA-EASY
ULTRA-POWERFUL

Since 1957, the Myron L Company has designed and manufactured highly reliable analytical instruments for a wide variety of applications. Thousands of professionals around the world rely every day on the performance of our instruments. Demanding uses range from boiler water testing to ultrapure water control to medical instruments for artificial kidney machines.

We are proud of the trust our handheld instruments and monitor/controllers have earned in the past. Our product line has evolved to a new level of outstanding performance and value in analytical instruments: the Ultrameter II series. While priced like affordable single-parameter instruments, the Ultrameter II does the job of three, four or even six instruments.

Accuracy You Can Trust

Both Ultrameter II models deliver performance of ±1% of reading (not merely full scale). This high level of accuracy has been achieved through advanced four-electrode conductivity cell technology, a unique pH/ORP sensor and powerful microprocessor-based circuitry. With displayed values of up to 9999, the full four-digit LCD ensures resolution levels never before possible in such affordable instruments. Factory calibrated with NIST traceable solutions, each Ultrameter II may be supplied with both certification of traceability and NIST traceable solutions for definitive calibration.

Fast and accurate in the laboratory, both Ultrameter II models are rugged enough for daily in-line controller checks in hostile process applications.

Innovative Engineering

The Ultrameter II is a prime example of how high-tech engineering can greatly simplify and streamline a task. Whether in the lab, industrial plant, or in a remote field location, merely:

1. Fill the cell cup
2. Push a parameter key
3. Take the reading

Temperature compensation and range selection are both rapid and automatic. The Ultrameter II is a true one-hand operation instrument.

Easy to Calibrate

All calibrations are quickly accomplished by pressing the ☒ or ☒ keys to agree with our NIST traceable Standard Solution. When calibration is necessary, display prompts simplify pH calibration and make sure the correct buffer is being used. Plus, all parameters (excluding factory-set temperature) have an internal electronic setting that can be used for field calibration and as a check on pH/ORP sensor life.

Advanced Features

- Fully automatic temperature compensation
- User adjustable temperature compensation (up to 9.99%/°C) which also allows TC to be disabled for applications requiring non-compensated readings.
- User adjustable conductivity/TDS conversion ratio for greater accuracy when measuring solutions not contained in the microprocessor.
- Auto-shutoff maximizes the life of the single 9V battery to more than 100 hours/5000 tests.
- Non-volatile microprocessor provides data back-up, even when the battery is changed. This assures all calibrations and memory data will be retained.
- Extended life pH/ORP sensor is user replaceable in the field.

High Performance at a Low Cost

Beyond their affordable purchase price, Ultra-Fast, Ultra-Easy, Ultra-Powerful Ultrameter II's save both time and money. Measure for measure, Ultrameter II's give you a better return on your investment than any other handheld instrument. To see for yourself, contact your distributor or the Myron L Company today.

Multiple Applications

Irrigation Water

Hydroponics

Laboratories

Homeland Security

Reverse Osmosis

Deionization

Wastewater

Cooling Towers

Environmental

Desalination

Fountain Solutions

BENEFITS DESIGNED TO SAVE YOU TIME & MONEY

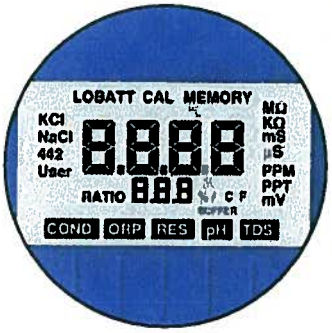
Built-in IR Port allows you to conveniently download your data to a computer. **(Requires Myron L uDock™ Accessory Package)**

Ample memory provides increased flexibility to record and store 100 separate readings.

Real Time Clock with Date & Time Stamp allows you to maintain the integrity of each individual reading.

The advanced four-electrode cell for conductivity/resistivity/TDS eliminates polarization, allowing greater accuracy and stability with minimal maintenance.

The pH/ORP sensor chamber provides protection to a unique porous liquid-junction.



The large capacity KCl reservoir guarantees extended life.

A custom LCD helps simplify calibration and operation by using annunciators and prompts to indicate various conditions.

IP67/NEMA 6 rated Ultrameter II's are waterproof and buoyant and can be fully immersed to 3 feet/1 meter.

Features

Ultrameter II™ Models	4PII Conductivity TDS, Resistivity Temperature	6PII Conductivity, TDS Resistivity, pH ORP, Temperature
Autoranging	•	•
Adjustable Temp. Compensation	•	•
Adjustable Cond/TDS ratio	•	•
Memory (100 readings)	•	•
Date & Time Stamp	•	•
pH Calibration Prompts		•
Low battery indicator	•	•
Auto-off	•	•

Specifications

Display	4 Digit Liquid Crystal Display
Dimensions LxWxH	196 x 68 x 64 mm/ 7.7 x 2.7 x 2.5 inches
Weight	352 g/12.4 oz.
Case/conductivity cell material	VALOX*
Cell capacities	pH/ORP: 1,2 ml/0.04 oz. Cond/TDS/Res: 5 ml/0.2 oz.
Power	9V alkaline battery
Battery life	>100 hours (5000 readings)
Operating/storage temperature	0 – 55°C/32 – 132°F
Protection ratings	IP67/NEMA 6 Waterproof to 1 meter/3 feet

*™GENERAL ELECTRIC

Parameters

	Conductivity	TDS	Resistivity	pH	ORP	Temperature
Ranges	0–9999 µS/cm 10–200 mS/cm in 5 autoranges	0–9999 ppm 10–200 ppt in 5 autoranges	10 KΩ–30 MΩ	0–14 pH	±999 mV	0–71°C 32–160°F
Resolution	0.01(<100 µS) 0.1(<1000 µS) 1.0(<10 mS) 0.01(<100 mS) 0.1(<200 mS)	0.01(<100 ppm) 0.1(<1000 ppm) 1.0(<10 ppt) 0.01(<100 ppt) 0.1(<200 ppt)	0.01(<100 KΩ) 0.1(<1000 KΩ) 0.1(>1 MΩ)	±0.01 pH	±1 mV	0.1°C/F
Accuracy	±1% of reading	±1% of reading	±1% of reading	±0.01 pH	±1 mV	±0.1°C
Auto Temperature Compensation	0–71°C 32–160°F	0–71°C 32–160°F	0–71°C 32–160°F	0–71°C 32–160°F	—	—
Adjustable Temperature Compensation to 25°C	0–9.99%/°C	0–9.99%/°C	0–9.99%/°C	—	—	—
Conductivity/TDS Ratios Preprogrammed	KCl, 442*, NaCl	KCl, 442*, NaCl	—	—	—	—
Adjustable Conductivity/TDS Ratio Factor	0.20–7.99	0.20–7.99	—	—	—	—

*442 Natural Water Standard ™ Myron L Company

Accessories

uDock™ Accessory Package includes uDock™, USB cable and Macintosh/PC application software for downloading data. MODEL: U2CIP

Certificates confirming the NIST traceability of an Ultrameter II are available (must be specified when placing instrument order). MODEL: MC

Conductivity Standard Solutions are necessary to maintain accuracy and for periodic calibration of conductivity/TDS parameters. All Standard Solutions are NIST traceable for your complete confidence. RECOMMENDED VALUES: KCl-7000 (7 mS), 442-3000 (TDS), or NaCl-14.0 (mS) available in 2 oz/59 ml, 1 qt/1 L, and 1 gal/3,8 L.

pH Buffers are necessary to maintain accuracy and for periodic calibration of pH and ORP parameters. Calibration with pH 7 Buffer is especially important. All pH 4, 7, and 10 Buffers are NIST traceable and are available in 2 oz/59 ml, 1 qt/1 L, and 1 gal/3,8 L.

pH Sensor Storage Solution
Available in 2 oz/59 ml, 1 qt/1 L, and 1 gal/3,8 L.
MODEL: SS20Z, SSQ and SSG

Certificate of NIST traceability for pH Buffer or Conductivity Standard Solutions are available (must be specified when placing solution order). MODEL: SC

Hard protective case (small)
MODEL: UPP

Hard protective case (kit) with three buffers (pH 4, 7, and 10), one pH/ORP storage solution, and two standard solutions, (KCl-7000 and 442-3000). All bottles are 2 oz/59 ml.
MODEL: PKU

Soft protective case is constructed of padded Nylon and features a belt clip for hands-free mobility.
MODEL: UCC (Blue)
UCCDT (Desert Tan)

Replacement pH/ORP sensor user-replaceable, features a unique/porous liquid-junction.
MODEL: RPR

Built on Trust

Founded in 1957, Myron L Company is one of the world's leading manufacturers of water quality instruments. Because of our policy of continuous product improvement, changes in design and the specifications in this brochure are possible. You have our assurance any changes will be guided by our product philosophy: Accuracy, Reliability, Simplicity.

Limited Warranty

All Myron L Ultrameter II's have a Two (2) Year Limited Warranty. The pH/ORP sensors have a Six (6) Month Limited Warranty. Warranty is limited to the repair or replacement of the Ultrameter II only, at our discretion. Myron L Company assumes no other responsibility or liability.

MYRON L COMPANY
Water Quality Instrumentation
Accuracy • Reliability • Simplicity

www.myronl.com

2450 Impala Drive
Carlsbad, California 92010-7226 USA
Tel: +1-760-438-2021
Fax: +1-800-869-7668 / +1-760-931-9189

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SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

UMIIB 03-08

APPENDIX B

FLUX METER DATA

AreaAbbre	SitePt	Easting	Northing	CH4flux	CO2flux	H2Sflux	Date
AW	aw071410_	2319968	1219892	0	0.008332	0	7/14/2010
AW	aw071410_	2319925	1219904	0	0.068257	0	7/14/2010
AW	aw071410_	2319874	1219900	0	0.176989	0.000238	7/14/2010
AW	aw071410_	2319837	1219903	0	0.160619	0.000237	7/14/2010
AW	aw071410_	2319851	1219945	0	0.044184	0.000238	7/14/2010
AW	aw071410_	2319901	1219942	0	0.105929	0	7/14/2010
AW	aw071410_	2319950	1219936	0	0.074666	0	7/14/2010
AW	aw071410_	2319996	1219934	0	0	0.001895	7/14/2010
AW	aw071410_	2320046	1219934	0	0.210719	0.001421	7/14/2010
AW	aw071410_	2320047	1219887	0	0.105385	0.000947	7/14/2010
AW	aw071410_	2320053	1219846	0	0.153295	0.00071	7/14/2010
AW	aw071410_	2320009	1219844	0	0.290957	0.002602	7/14/2010
AW	aw071410_	2319971	1219833	0	0.206745	0.001181	7/14/2010
AW	aw071410_	2319916	1219850	0	0.224187	0.003544	7/14/2010
AW	aw071410_	2319880	1219847	0	0.123944	0.000708	7/14/2010
AW	aw071410_	2319840	1219840	0	0.147167	0.000236	7/14/2010
AW	aw071410_	2319871	1219987	0	0.022619	0.000236	7/14/2010
AW	aw071410_	2319915	1219983	0	0.160825	0.000706	7/14/2010
AW	aw071410_	2319959	1219983	0	0.104777	0	7/14/2010
AW	aw071410_	2320008	1219888	0	0.019997	0	7/14/2010
BA	baird71410	2330749	1230693	0	0.044095	0.001625	7/14/2010
BA	baird71410	2330778	1230709	0.000464	0.100658	0.001624	7/14/2010
BA	baird71410	2330806	1230724	0	0.055214	0.001392	7/14/2010
BA	baird71410	2330830	1230748	0	0.154875	0.001625	7/14/2010
BA	baird71410	2330857	1230766	0	0.228192	0.003507	7/14/2010
BA	baird71410	2330874	1230737	0	0.046621	0.002783	7/14/2010
BA	baird71410	2330891	1230709	0.000466	0.237427	0.002095	7/14/2010
BA	baird71410	2330907	1230683	0	0.191588	0.003747	7/14/2010
BA	baird71410	2330919	1230653	0.001392	0.10488	0	7/14/2010
BA	baird71410	2330888	1230638	0	0.112276		7/14/2010
BA	baird71410	2330865	1230628	0	0.027141		7/14/2010
BA	baird71410	2330835	1230618	0	0.302264		7/14/2010
BA	baird71410	2330802	1230608	0.000232	0.119684		7/14/2010
BA	baird71410	2330772	1230594	0	0.105489		7/14/2010
BA	baird71410	2330741	1230580	0	0.253701		7/14/2010
BA	baird71410	2330729	1230613	0	0.155587	0.002551	7/14/2010
BA	baird71410	2330704	1230635	0	0.156283	0.002087	7/14/2010
BA	baird71410	2330681	1230656	0	0.073726	0	7/14/2010
BA	baird71410	2330663	1230682	0	0.074644	0.000232	7/14/2010
BA	baird71410	2330648	1230712	0	0.116581	0.004867	7/14/2010
BA	baird71410	2330673	1230731	0	0.126762	0	7/14/2010
BA	baird71410	2330701	1230750	0	0.115154	0.000232	7/14/2010
BA	baird71410	2330729	1230765	0	0.110056	0.001854	7/14/2010
BA	baird71410	2330763	1230783	0	0.208026	0.005096	7/14/2010
BA	baird71410	2330789	1230803	0	0.148027	0.006718	7/14/2010
BA	baird71410	2330821	1230817	0	0.175594	0.005791	7/14/2010
BA	baird71410	2330835	1230799	0	0.070178	0.000232	7/14/2010
BA	baird71410	2330856	1230700	0	0.039608	0.003243	7/14/2010
BA	baird71410	2330828	1230681	0	0.2241	0.002547	7/14/2010
BA	baird71410	2330789	1230655	0	0.155042	0.000694	7/14/2010

BA	baird71410	2330746	1230634	0	0.229121	0.000926	7/14/2010
BA	baird71410	2330720	1230672	0	0.240587	0.008559	7/14/2010
BC-CJ	bc61710_0	2304397	1209801	0		0	6/17/2010
BC-CJ	bc61710_0	2304215	1209795	0		0.000762	6/17/2010
BC-CJ	bc61710_0	2304003	1209798	0		0.001268	6/17/2010
BC-CJ	bc61710_0	2303809	1209819	0		0	6/17/2010
BC-CJ	bc61710_0	2303600	1209791	0.006557		0.000757	6/17/2010
BC-CJ	bc61710_0	2303400	1209797	0		0	6/17/2010
BC-CJ	bc61710_0	2303201	1209813	0		0	6/17/2010
BC-CJ	bc61710_0	2303395	1209999	0		0.000251	6/17/2010
BC-CJ	bc61710_0	2303606	1209990	0		0	6/17/2010
BC-CJ	bc61710_1	2303805	1210002	0		0.00075	6/17/2010
BC-CJ	bc61710_1	2304033	1213744	0	0.142092	0.0007	6/18/2010
BC-CJ	bc61710_1	2303989	1213506	0	0.146702	0.0007	6/18/2010
BC-CJ	bc61710_1	2304028	1213358	0	0.08292	0.002336	6/18/2010
BC-CJ	bc61710_1	2304018	1213151	0	0.068768	0.001632	6/18/2010
BC-CJ	bc61710_1	2304813	1213596	0	0.006524	0.001398	6/18/2010
BC-CJ	bc61710_1	2304799	1213395	0	0.085393	0.000936	6/18/2010
BC-CJ	bc61710_1	2304797	1213197	0	1.604775	0.002337	6/18/2010
BC-CJ	bc61710_1	2304793	1213014	0.460147	2.041363	0.0007	6/18/2010
BC-CJ	bc61710_1	2304796	1212806	0	0.128205	0.000932	6/18/2010
BC-CJ	bc61710_1	2302008	1209610	0	0.001766	0	6/21/2010
BC-CJ	bc61710_1	2303997	1209998	0		0.00025	6/17/2010
BC-CJ	bc61710_1	2301905	1209419	0	0.078695	0	6/21/2010
BC-CJ	bc61710_1	2301795	1209368	0	0	0	6/21/2010
BC-CJ	bc61710_1	2301615	1209323	0	0.162573	0.000494	6/21/2010
BC-CJ	bc61710_1	2301626	1209206	0	0	0	6/21/2010
BC-CJ	bc61710_1	2301399	1209210	0	0	0	6/21/2010
BC-CJ	bc61710_1	2301375	1209040	0	0	0	6/21/2010
BC-CJ	bc61710_1	2301213	1209012	0.385108	0.249316	0	6/21/2010
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BC-CJ	bc61710_1	2300814	1208984	0.171055	0.162166	0	6/21/2010
BC-CJ	bc61710_1	2300587	1208973	0	0.047348	0.001428	6/21/2010
BC-CJ	bc61710_1	2304198	1210008	0		0	6/17/2010
BC-CJ	bc61710_1	2300405	1208947	0	0.203551	0.000937	6/21/2010
BC-CJ	bc61710_1	2300207	1208929	0	0.047884	0.001168	6/21/2010
BC-CJ	bc61710_1	2300151	1208809	0	0	0.001168	6/21/2010
BC-CJ	bc61710_1	2300013	1208748	0	0.238048	0.000934	6/21/2010
BC-CJ	bc61710_1	2299821	1208725	0.77392	0.523184	0.001167	6/21/2010
BC-CJ	bc61710_1	2299788	1208606	0	0.245929	0	6/21/2010
BC-CJ	bc61710_1	2299941	1208577	0.00419	0	0.000698	6/21/2010
BC-CJ	bc61710_1	2299989	1208372	0	0.236816	0.000466	6/21/2010
BC-CJ	bc61710_1	2300222	1208408	0.00419	0	0.000698	6/21/2010
BC-CJ	bc61710_1	2300426	1208385	0	0.083577	0.00163	6/21/2010
BC-CJ	bc61710_1	2304399	1210011	0.000249		0.000249	6/17/2010
BC-CJ	bc61710_1	2300599	1208398	0	0.043304	0.001397	6/21/2010
BC-CJ	bc61710_1	2300804	1208389	0	0.319326	0.001396	6/21/2010
BC-CJ	bc61710_1	2300992	1208398	0	0	0.001396	6/21/2010
BC-CJ	bc61710_1	2301002	1208587	0	0.168347	0.001163	6/21/2010
BC-CJ	bc61710_1	2301008	1208777	0	0	0	6/21/2010
BC-CJ	bc61710_1	2301208	1208840	0	0.537936	0.000934	6/21/2010

BC-CJ	bc61710_1	2301350	1208829	0	0.023913	0.000938	6/21/2010
BC-CJ	bc61710_1	2304011	1209623	0	0.157923		6/22/2010
BC-CJ	bc61710_1	2303798	1209589	0	0	0.000253	6/22/2010
BC-CJ	bc61710_1	2303607	1209597	0	0.008058	0	6/22/2010
BC-CJ	bc61710_1	2304598	1209806	0		0	6/17/2010
BC-CJ	bc61710_1	2303398	1209589	0	0	0	6/22/2010
BC-CJ	bc61710_1	2303211	1209613	0	0	0	6/22/2010
BC-CJ	bc61710_1	2303013	1209604	0	0.452473	0.000495	6/22/2010
BC-CJ	bc61710_1	2302801	1209611	0	0.216032	0.000738	6/22/2010
BC-CJ	bc61710_1	2302591	1209599	0.998267	0.642233	0.000245	6/22/2010
BC-CJ	bc61710_1	2302600	1209392	0	0.054847	0.000725	6/22/2010
BC-CJ	bc61710_1	2302800	1209408	0	0.075968	0.000962	6/22/2010
BC-CJ	bc61710_1	2303013	1209377	0	0.264002	0.000719	6/22/2010
BC-CJ	bc61710_1	2303210	1209404	0	0	0	6/22/2010
BC-CJ	bc61710_1	2303407	1209411	0	0.04782	0	6/22/2010
BC-CJ	bc61710_1	2304792	1209989	0	0.051738	0.000497	6/17/2010
BC-CJ	bc61710_1	2303592	1209405	0	0	0.000481	6/22/2010
BC-CJ	bc61710_1	2303799	1209393	0	0.196607	0.000961	6/22/2010
BC-CJ	bc61710_1	2304023	1209408	0	0.137135	0.001925	6/22/2010
BC-CJ	bc61710_1	2304211	1209405	0	0	0.000963	6/22/2010
BC-CJ	bc61710_1	2304399	1209395	0	0	0.000963	6/22/2010
BC-CJ	bc61710_1	2304004	1209197	0	0.254686	0.001679	6/22/2010
BC-CJ	bc61710_1	2303801	1209181	0	0.208382	0.001673	6/22/2010
BC-CJ	bc61710_1	2303588	1209190	0	0	0	6/22/2010
BC-CJ	bc61710_1	2303384	1209195	0.004766	0.109132	0.002859	6/22/2010
BC-CJ	bc61710_1	2303206	1209221	0	0.00832	0.000238	6/22/2010
BC-CJ	bc61710_1	2304619	1210038	0	0.009185	0	6/17/2010
BC-CJ	bc61710_1	2302975	1209201	0	0.060151	0.00071	6/22/2010
BC-CJ	bc61710_1	2302796	1209187	0	0.008023	0.000944	6/22/2010
BC-CJ	bc61710_1	2302614	1209174	0	0.033767	0.001181	6/22/2010
BC-CJ	bc61710_1	2302385	1209187	0	0	0	6/22/2010
BC-CJ	bc61710_1	2302174	1209190	0	0.227555	0.000238	6/22/2010
BC-CJ	bc61710_1	2302000	1209192	0	0	0	6/22/2010
BC-CJ	bc61710_1	2301818	1209196	0	0.202937	0.000471	6/22/2010
BC-CJ	bc61710_1	2302148	1209376	0	0	0	6/22/2010
BC-CJ	bc61710_1	2303051	1209017	0	0.117404	0.000251	6/23/2010
BC-CJ	bc61710_1	2303151	1208976	0	0.106239	0	6/23/2010
BC-CJ	bc61710_1	2304607	1210201	0	0.0761	0	6/17/2010
BC-CJ	bc61710_1	2302810	1208971	0	0.395696	0.000247	6/23/2010
BC-CJ	bc61710_1	2302622	1208995	0	0.096161	0	6/23/2010
BC-CJ	bc61710_1	2302398	1208979	0	0	0.000487	6/23/2010
BC-CJ	bc61710_1	2302216	1208999	0	0.579729	0	6/23/2010
BC-CJ	bc61710_1	2301989	1209013	0	0	0	6/23/2010
BC-CJ	bc61710_1	2301775	1209009	0	0	0	6/23/2010
BC-CJ	bc61710_1	2301611	1208992	0	0	0	6/23/2010
BC-CJ	bc61710_1	2301578	1208797	0	0.238224	0.000239	6/23/2010
BC-CJ	bc61710_1	2301806	1208802	0	0.323327	0	6/23/2010
BC-CJ	bc61710_1	2301992	1208773	0	0.125884	0	6/23/2010
BC-CJ	bc61710_1	2304799	1210187	0	0.027621	0	6/17/2010
BC-CJ	bc61710_1	2302206	1208772	0	0.146721	0.000965	6/23/2010
BC-CJ	bc61710_1	2302390	1208833	0	0.213546	0.000957	6/23/2010

BC-CJ	bc61710_1	2301998	1208596	0	0.277358	0.002141	6/23/2010
BC-CJ	bc61710_1	2301799	1208580	0	0.099573	0.000236	6/23/2010
BC-CJ	bc61710_1	2301592	1208587	0	0	0	6/23/2010
BC-CJ	bc61710_1	2301391	1208611	0	0.135938	0.000941	6/23/2010
BC-CJ	bc61710_1	2301209	1208587	0	0.007273	0	6/23/2010
BC-CJ	bc61710_1	2300804	1208613	0	0.235934	0.000466	6/23/2010
BC-CJ	bc61710_1	2300603	1208614	0	0	0	6/23/2010
BC-CJ	bc61710_1	2300385	1208591	0	0.014609	0.000232	6/23/2010
BC-CJ	bc61710_1	2304378	1210210	0	0.614901	0	6/17/2010
BC-CJ	bc61710_1	2300203	1208583	0	0	0.001165	6/23/2010
BC-CJ	bc61710_1	2300432	1208813	0	0.043812		6/23/2010
BC-CJ	bc61710_1	2300659	1208815	0	0.792248	0.001388	6/23/2010
BC-CJ	bc61710_1	2300788	1208811	0.297126	0	0.00116	6/23/2010
BC-CJ	bc61710_1	2304201	1209591	0.297126	0	0.00116	6/23/2010
BC-CJ	bc61710_1	2304390	1209587	0	0.942369	0	6/23/2010
BC-CJ	bc61710_1	2304575	1209609	0	0.070641	0	6/23/2010
BC-CJ	bc61710_2	2304202	1210203	0	0.071815	0.000494	6/17/2010
BC-CJ	bc61710_2	2304009	1210201	0	0	0	6/17/2010
BC-CJ	bc61710_2	2303797	1210192	0	0	0	6/17/2010
BC-CJ	bc61710_2	2303594	1210202	0	0	0	6/17/2010
BC-CJ	bc61710_2	2303392	1210199	0	0	0	6/17/2010
BC-CJ	bc61710_2	2303600	1210401	0	0.004166	0.000245	6/17/2010
BC-CJ	bc61710_2	2303803	1210365	0	0.09202	0.001963	6/17/2010
BC-CJ	bc61710_2	2304015	1210380	0.000492	0.032945	0	6/17/2010
BC-CJ	bc61710_2	2304163	1210397	0	0.022139	0	6/17/2010
BC-CJ	bc61710_2	2304403	1210378	0	0.258255	0.000243	6/17/2010
BC-CJ	bc61710_3	2304622	1210393	0	0	0.000244	6/17/2010
BC-CJ	bc61710_3	2304801	1210373	0	0.093958	0.000243	6/17/2010
BC-CJ	bc61710_3	2304989	1210397	0	0	0.000729	6/17/2010
BC-CJ	bc61710_3	2304997	1210608	0	0.022549	0	6/17/2010
BC-CJ	bc61710_3	2304799	1210616	0	0	0	6/17/2010
BC-CJ	bc61710_3	2304602	1210614	0	0	0	6/17/2010
BC-CJ	bc61710_3	2304392	1210599	0	0.031537	0	6/17/2010
BC-CJ	bc61710_3	2304212	1210605	0.000243	0	0	6/17/2010
BC-CJ	bc61710_3	2304003	1210606	0	0.124467	0.000726	6/17/2010
BC-CJ	bc61710_3	2303811	1210596	0	0.140761	0.000241	6/17/2010
BC-CJ	bc61710_4	2303614	1210592	0	0.049854	0.000723	6/17/2010
BC-CJ	bc61710_4	2303610	1210792	0	0.184436	0.002649	6/17/2010
BC-CJ	bc61710_4	2303794	1210807	0	0.10628	0	6/17/2010
BC-CJ	bc61710_4	2303996	1210803	0	0.04287	0.000718	6/17/2010
BC-CJ	bc61710_4	2304199	1210808	0	0.18166	0.001675	6/17/2010
BC-CJ	bc61710_4	2304388	1210804	0	0.160292	0.0012	6/17/2010
BC-CJ	bc61710_4	2304567	1210830	0.00024	0.04447	0.000721	6/17/2010
BC-CJ	bc61710_4	2304776	1210814	0	0.010544	0.00024	6/17/2010
BC-CJ	bc61710_4	2304990	1210804	0.000718	0.176049	0.000478	6/17/2010
BC-CJ	bc61710_4	2305023	1211021	0	0.029167	0.000239	6/17/2010
BC-CJ	bc61710_5	2304801	1210976	0	0.144542	0	6/17/2010
BC-CJ	bc61710_5	2304610	1211002	0	0.155334	0.000954	6/17/2010
BC-CJ	bc61710_5	2304418	1210991	0	0.032234	0.000955	6/17/2010
BC-CJ	bc61710_5	2304223	1210979	0.000479	0.023954	0.000719	6/17/2010
BC-CJ	bc61710_5	2303999	1210971	0.00024	0	0	6/17/2010

BC-CJ	bc61710_5	2303805	1210990	0.000238	0.019308	0.000953	6/17/2010
BC-CJ	bc61710_5	2303598	1210999	0	0.038945	0.002137	6/17/2010
BC-CJ	bc61710_5	2304993	1211199	0	0.058113	0.000474	6/17/2010
BC-CJ	bc61710_5	2304789	1211194	0	0	0.00142	6/17/2010
BC-CJ	bc61710_5	2304604	1211187	0	0.793681	0.002597	6/17/2010
BC-CJ	bc61710_6	2304405	1211182	0.000472	0	0	6/17/2010
BC-CJ	bc61710_6	2304198	1211158	0	0.131742	0	6/17/2010
BC-CJ	bc61710_6	2303959	1211186	0	0.020125	0.000947	6/17/2010
BC-CJ	bc61710_6	2303828	1211228	0	0.086491	0	6/17/2010
BC-CJ	bc61710_6	2303587	1211201	0	0	0.000706	6/17/2010
BC-CJ	bc61710_6	2304155	1211418	0	0	0.000934	6/17/2010
BC-CJ	bc61710_6	2304171	1211587	0	0.077218	0	6/17/2010
BC-CJ	bc61710_6	2304196	1211791	0.000234	0	0	6/17/2010
BC-CJ	bc61710_6	2304209	1211989	0	0.180953	0.004425	6/17/2010
BC-CJ	bc61710_6	2304190	1212202	0	0.003256	0.000698	6/17/2010
BC-CJ	bc61710_7	2304174	1212382	0	0.071143	0.001854	6/17/2010
BC-CJ	bc61710_7	2304197	1212606	0	0.78435	0.001848	6/17/2010
BC-CJ	bc61710_7	2304219	1212796	0	0.125179	0.001844	6/17/2010
BC-CJ	bc61710_7	2304231	1213003	0	0.1682	0.001149	6/17/2010
BC-CJ	bc61710_7	2304223	1213188	0.000229	0.093524	0.002521	6/17/2010
BC-CJ	bc61710_7	2304212	1213382	0	0.199867	0.002287	6/17/2010
BC-CJ	bc61710_7	2304199	1213600	0.000228	0.056701	0.002049	6/17/2010
BC-CJ	bc61710_7	2304407	1213570	0	0.060278	0.001365	6/17/2010
BC-CJ	bc61710_7	2304397	1213386	0	0.148746	0.000911	6/17/2010
BC-CJ	bc61710_7	2304413	1213197	0.000228	0.230195	0.001825	6/17/2010
BC-CJ	bc61710_8	2304379	1213010	0	0.10778	0.002055	6/17/2010
BC-CJ	bc61710_8	2304389	1212795	0	0.074351	0.00183	6/17/2010
BC-CJ	bc61710_8	2304427	1212576	0	0.191852	0.001375	6/17/2010
BC-CJ	bc61710_8	2304399	1212416	0	1.190764	0.002525	6/17/2010
BC-CJ	bc61710_8	2304406	1212200	0	0.754344	0.002534	6/17/2010
BC-CJ	bc61710_8	2304405	1212016	0	0.151155	0.000462	6/17/2010
BC-CJ	bc61710_8	2304395	1211807	0	0.135568	0.006478	6/17/2010
BC-CJ	bc61710_8	2304411	1211608	0	0.049515	0.000232	6/17/2010
BC-CJ	bc61710_8	2304424	1211390	0	0.099243	0.001864	6/17/2010
BC-CJ	bc61710_8	2304637	1212576	1.550258	1.456778	0.000489	6/18/2010
BC-CJ	bc61710_9	2304596	1212791	0.111091	0.083379	0.000729	6/18/2010
BC-CJ	bc61710_9	2304593	1213002	0.646556	0.42195	0.00193	6/18/2010
BC-CJ	bc61710_9	2304613	1213202	0	0.516303	0.001439	6/18/2010
BC-CJ	bc61710_9	2304614	1213411	0	1.239166	0.002868	6/18/2010
BC-CJ	bc61710_9	2304554	1213592	0	0.034322	0.000238	6/18/2010
BC-CJ	bc61710_9	2304603	1213828	0	0	0.00119	6/18/2010
BC-CJ	bc61710_9	2304406	1213802	0	0	0.001185	6/18/2010
BC-CJ	bc61710_9	2304214	1214011	0	0.00921	0.000236	6/18/2010
BC-CJ	bc61710_9	2304195	1213787	0	0.056407	0.00188	6/18/2010
BC-CJ	bc61710_9	2303993	1213966	0	0	0.001407	6/18/2010
BC-CJ	bc62110_0	2304767	1212594	0	0.217017	0.000994	6/21/2010
BC-CJ	bc62110_0	2304822	1212410	0	0.160052	0.005681	6/21/2010
BC-CJ	bc62110_0	2304804	1212207	0	0.146762	0.000737	6/21/2010
BC-CJ	bc62110_0	2304798	1211984	0	0.197885	0	6/21/2010
BC-CJ	bc62110_0	2304802	1211795	0.000246	0.273801	0.000982	6/21/2010
BC-CJ	bc62110_0	2304811	1211603	0	0.138125	0.000492	6/21/2010

BC-CJ	bc62110_0	2304813	1211389	0	0.170684	0.000982	6/21/2010
BC-CJ	bc62110_0	2304632	1211394	0.000245	0	0.00049	6/21/2010
BC-CJ	bc62110_0	2304613	1211595	7.241618	3.994252	0.000735	6/21/2010
BC-CJ	bc62110_1	2304599	1211793	0	0.092194	0.000245	6/21/2010
BC-CJ	bc62110_1	2306605	1214371	0	0.715109	0.003786	6/22/2010
BC-CJ	bc62110_1	2306986	1214606	0	0.274716	0.000507	6/23/2010
BC-CJ	bc62110_1	2307023	1214803	0	0.158939	0.000759	6/23/2010
BC-CJ	bc62110_1	2306991	1214987	0	0.044404	0	6/23/2010
BC-CJ	bc62110_1	2306986	1215151	0	0.10078	0	6/23/2010
BC-CJ	bc62110_1	2307174	1215009	0.781482	0.494356	0.00025	6/23/2010
BC-CJ	bc62110_1	2307221	1214798	0	0.959493	0.000984	6/23/2010
BC-CJ	bc62110_1	2307382	1214796	0	0.118377	0.001745	6/23/2010
BC-CJ	bc62110_1	2307573	1214782	0	0.041833	0.000747	6/23/2010
BC-CJ	bc62110_1	2307592	1214609	0	0.138143	0.000996	6/23/2010
BC-CJ	bc62110_1	2304601	1212000	0.086947	0.200495	0.002217	6/21/2010
BC-CJ	bc62110_1	2307777	1214618	0	0.069553	0.001238	6/23/2010
BC-CJ	bc62110_1	2307191	1215194	0	0.550858	0.007394	6/23/2010
BC-CJ	bc62110_1	2307387	1215174	0	0.251244	0.001226	6/23/2010
BC-CJ	bc62110_1	2307427	1215007	0	0.112463	0.001964	6/23/2010
BC-CJ	bc62110_1	2307604	1214987	0	0.472455	0.006606	6/23/2010
BC-CJ	bc62110_1	2307615	1215208	0	0.06024	0.001959	6/23/2010
BC-CJ	bc62110_1	2307782	1215203	0	0.112618	0.002448	6/23/2010
BC-CJ	bc62110_1	2307818	1214990	0	0.176123	0.001708	6/23/2010
BC-CJ	bc62110_1	2307760	1214819	0.000716	0.03581	0.00191	6/23/2010
BC-CJ	bc62110_1	2308019	1214979	0	0.043238	0.001911	6/23/2010
BC-CJ	bc62110_1	2304592	1212213	0	0.338685	0.001458	6/21/2010
BC-CJ	bc62110_1	2308218	1214999	0	0.266318	0.003576	6/23/2010
BC-CJ	bc62110_1	2308184	1214771	0	0.35202	0.000478	6/23/2010
BC-CJ	bc62110_1	2308181	1214581	0.000238	0.391689	0.006191	6/23/2010
BC-CJ	bc62110_1	2308189	1214407	0	0.133323	0.003565	6/23/2010
BC-CJ	bc62110_1	2308198	1214180	0.000237	0.094284	0.002369	6/23/2010
BC-CJ	bc62110_1	2308008	1214215	0	0	0.001182	6/23/2010
BC-CJ	bc62110_1	2307790	1214229		0.140696	0.005167	6/23/2010
BC-CJ	bc62110_1	2307829	1214410	0.000234	0.030151	0.004908	6/23/2010
BC-CJ	bc62110_1	2308048	1214422	0	0.116594	0.001869	6/23/2010
BC-CJ	bc62110_1	2308019	1214582	0	0.109083	0.002569	6/23/2010
BC-CJ	bc62110_1	2304588	1212392	0	0.198973	0.000983	6/21/2010
BC-CJ	bc62110_1	2307956	1214691	0.001638	0	0.001871	6/23/2010
BC-CJ	bc62110_1	2309748	1215353	0	0.193341	0	6/24/2010
BC-CJ	bc62110_1	2309968	1215354	0	0	0	6/24/2010
BC-CJ	bc62110_1	2310175	1215353	0	0.133592	0	6/24/2010
BC-CJ	bc62110_1	2310158	1215153	0	1.64766	0	6/24/2010
BC-CJ	bc62110_1	2309945	1215156	0	0.009307	0	6/24/2010
BC-CJ	bc62110_1	2309762	1215162	0	0.539798		6/24/2010
BC-CJ	bc62110_1	2309533	1215159	0	0.070238		6/24/2010
BC-CJ	bc62110_1	2309358	1215163	0.004737	0.35823		6/24/2010
BC-CJ	bc62110_1	2309170	1215158	0	0.167477		6/24/2010
BC-CJ	bc62110_1	2304981	1211404	0	0	0.00168	6/21/2010
BC-CJ	bc62110_1	2309167	1214945	0	0.051566		6/24/2010
BC-CJ	bc62110_1	2309172	1214746	0	0.092261		6/24/2010
BC-CJ	bc62110_1	2309160	1214551	0	0.076497		6/24/2010

BC-CJ	bc62110_1	2309957	1214959	0	0.086027		6/24/2010
BC-CJ	bc62110_1	2309964	1214746	0.035088	0	0.000721	6/24/2010
BC-CJ	bc62110_1	2309957	1214554	0	0.663605		6/24/2010
BC-CJ	bc62110_1	2309974	1214346	0.00024	0.155055	0	6/24/2010
BC-CJ	bc62110_1	2309944	1214143	0	0.093861	0.001197	6/24/2010
BC-CJ	bc62110_1	2309724	1214152	0.000239	0.141972	0	6/24/2010
BC-CJ	bc62110_1	2309727	1214344	0	0.166238	0.001187	6/24/2010
BC-CJ	bc62110_1	2304992	1211614		0.114083	0.002417	6/21/2010
BC-CJ	bc62110_1	2309559	1214346	0	0.466157	0.00166	6/24/2010
BC-CJ	bc62110_1	2309361	1214347	0	0.013644	0	6/24/2010
BC-CJ	bc62110_1	2309169	1214328	0	0.180981	0.001172	6/24/2010
BC-CJ	bc62110_1	2308979	1214367	0	0.136769	0.002101	6/24/2010
BC-CJ	bc62110_1	2308795	1214357	0	0.243614		6/24/2010
BC-CJ	bc62110_1	2308613	1214382	0	0		6/24/2010
BC-CJ	bc62110_1	2308419	1214404	0	0		6/24/2010
BC-CJ	bc62110_1	2308395	1214583	0	0.046869		6/24/2010
BC-CJ	bc62110_1	2308606	1214591	0	0.29041		6/24/2010
BC-CJ	bc62110_1	2308819	1214610	0	0.23703		6/24/2010
BC-CJ	bc62110_1	2304991	1211794	0	0.157413	0.00337	6/21/2010
BC-CJ	bc62110_1	2308985	1214647	0.000233	0.034065		6/24/2010
BC-CJ	bc62110_1	2308997	1214793	0	0.052216	0.002797	6/24/2010
BC-CJ	bc62110_1	2308808	1214798	0	0	0.002091	6/24/2010
BC-CJ	bc62110_1	2308607	1214795	0	0		6/24/2010
BC-CJ	bc62110_1	2308397	1214801	0	0.152317	0	6/24/2010
BC-CJ	bc62110_1	2308401	1214982	0	0.088755		6/24/2010
BC-CJ	bc62110_1	2309790	1214982	0	0.040258	0	6/25/2010
BC-CJ	bc62110_1	2309578	1214937	0	0.969479	0	6/25/2010
BC-CJ	bc62110_1	2309413	1214944	0	0.120616	0.000249	6/25/2010
BC-CJ	bc62110_1	2309381	1214778	0	0.109064	0	6/25/2010
BC-CJ	bc62110_1	2304972	1212000	0	0.644069	0.001681	6/21/2010
BC-CJ	bc62110_1	2309368	1214658	2.906335	1.035452	0.000247	6/25/2010
BC-CJ	bc62110_1	2304987	1212189	0	0.277127	0.003593	6/21/2010
BC-CJ	bc62110_1	2304963	1212385	0	0.143279	0.00238	6/21/2010
BC-CJ	bc62110_2	2304990	1212602	0	0.055733	0.002134	6/21/2010
BC-CJ	bc62110_2	2305003	1212812	0	0.104285	0.000944	6/21/2010
BC-CJ	bc62110_2	2304991	1212984	0	0.165563	0.002153	6/21/2010
BC-CJ	bc62110_2	2304988	1213199	0	0.189074	0.004479	6/21/2010
BC-CJ	bc62110_2	2304991	1213399	0	0.082135	0.002353	6/21/2010
BC-CJ	bc62110_2	2304999	1213613	6.489862	2.730848	0.002342	6/21/2010
BC-CJ	bc62110_2	2304991	1213807	0	0.122544	0.003274	6/21/2010
BC-CJ	bc62110_2	2305178	1213794	0	0.066523	0.002568	6/21/2010
BC-CJ	bc62110_2	2305358	1213782	0	0.178682	0.001901	6/21/2010
BC-CJ	bc62110_2	2305599	1213792	0	0.135483	0.002344	6/21/2010
BC-CJ	bc62110_3	2305810	1213769	0	0.042376	0.002143	6/21/2010
BC-CJ	bc62110_3	2306023	1213784	0	0.159225	0.003575	6/21/2010
BC-CJ	bc62110_3	2306241	1213799	0	0.125497	0.002629	6/21/2010
BC-CJ	bc62110_3	2306395	1213787	0	0.059469	0.002388	6/21/2010
BC-CJ	bc62110_3	2306585	1213811	0	0.138014	0.002622	6/21/2010
BC-CJ	bc62110_3	2306778	1213803	0	0.033993	0.002615	6/21/2010
BC-CJ	bc62110_3	2306597	1213607	0	0.145492	0.003051	6/21/2010
BC-CJ	bc62110_3	2306397	1213592	0	0.095382	0.002584	6/21/2010

BC-CJ	bc62110_3	2306204	1213559	0.109817	0.066313	0.002822	6/21/2010
BC-CJ	bc62110_3	2305967	1213607	0	0.096893	0.003043	6/21/2010
BC-CJ	bc62110_4	2305783	1213602	0	0.096893	0.003043	6/21/2010
BC-CJ	bc62110_4	2305604	1213596	0	0.094097	0.003035	6/21/2010
BC-CJ	bc62110_4	2305392	1213597	9.288029	0.695146	0.002563	6/21/2010
BC-CJ	bc62110_4	2305187	1213606	0	1.735204	0.00302	6/21/2010
BC-CJ	bc62110_4	2305202	1213408	0	0.566631	0.00302	6/21/2010
BC-CJ	bc62110_4	2305217	1213205	0	0.272473	0.00401	6/21/2010
BC-CJ	bc62110_4	2305211	1213027	0	0.127458	0.003547	6/21/2010
BC-CJ	bc62110_4	2305230	1212779	2.859314	2.28437	0.002334	6/21/2010
BC-CJ	bc62110_4	2305190	1212608	0	0.521896	0.002836	6/21/2010
BC-CJ	bc62110_4	2305591	1212210	0	0.091915	0	6/22/2010
BC-CJ	bc62110_5	2305401	1212172	0	0.080435	0	6/22/2010
BC-CJ	bc62110_5	2305209	1212207	0	0.13556	0.000251	6/22/2010
BC-CJ	bc62110_5	2305207	1212407	0	0.111099	0	6/22/2010
BC-CJ	bc62110_5	2305389	1212409	0	0.015646	0	6/22/2010
BC-CJ	bc62110_5	2305595	1212410	0.003237	0.064492	0.000747	6/22/2010
BC-CJ	bc62110_5	2305814	1212406	0	0.085004	0.000249	6/22/2010
BC-CJ	bc62110_5	2306006	1212592	0	0.116851	0.001508	6/22/2010
BC-CJ	bc62110_5	2305807	1212610	0.006024	0	0.000251	6/22/2010
BC-CJ	bc62110_5	2305603	1212612	0	0.082399	0	6/22/2010
BC-CJ	bc62110_5	2305408	1212592	0.080693	0.569008	0.000489	6/22/2010
BC-CJ	bc62110_6	2305434	1212810	1.281632	0.194946	0.000243	6/22/2010
BC-CJ	bc62110_6	2305402	1212998	0	0.017017	0.000243	6/22/2010
BC-CJ	bc62110_6	2305383	1213200	0	0.522968	0.000726	6/22/2010
BC-CJ	bc62110_6	2305396	1213413	1.171907	2.22761	0.001684	6/22/2010
BC-CJ	bc62110_6	2305598	1213381	0	0.406049	0.001943	6/22/2010
BC-CJ	bc62110_6	2305805	1213395	0.00146	0.111933	0.00146	6/22/2010
BC-CJ	bc62110_6	2305989	1213413	0	0	0.000974	6/22/2010
BC-CJ	bc62110_6	2306164	1213427	0	0.017317	0.004634	6/22/2010
BC-CJ	bc62110_6	2306390	1213328	0	0.413485	0.001707	6/22/2010
BC-CJ	bc62110_6	2306637	1213345	0	0	0.001444	6/22/2010
BC-CJ	bc62110_7	2306589	1213216	0	0.21847	0.002192	6/22/2010
BC-CJ	bc62110_7	2306399	1213173	0	0	0.001707	6/22/2010
BC-CJ	bc62110_7	2306207	1213202	0	0.029292	0.001681	6/22/2010
BC-CJ	bc62110_7	2306034	1213212	0	0.051493	0.001457	6/22/2010
BC-CJ	bc62110_7	2305778	1213194	0	0.466311	0.001453	6/22/2010
BC-CJ	bc62110_7	2305604	1213190	0	0.824656	0.001206	6/22/2010
BC-CJ	bc62110_7	2305590	1212969	0	0.149154	0.001665	6/22/2010
BC-CJ	bc62110_7	2305613	1212819	0.128553	0.165041	0.001933	6/22/2010
BC-CJ	bc62110_7	2305776	1212796	0	0.143528	0.002384	6/22/2010
BC-CJ	bc62110_7	2305799	1213005	0	0.010345	0.001925	6/22/2010
BC-CJ	bc62110_8	2306001	1212995	0	0.194906	0.002168	6/22/2010
BC-CJ	bc62110_8	2305975	1212806	1.262146	0.826483	0.001929	6/22/2010
BC-CJ	bc62110_8	2306188	1212794	0	0.166573	0.002414	6/22/2010
BC-CJ	bc62110_8	2306233	1213007	0	0	0.001664	6/22/2010
BC-CJ	bc62110_8	2306390	1213019	0	0.005961	0.001669	6/22/2010
BC-CJ	bc62110_8	2306792	1213970	0	2.045558	0.002356	6/22/2010
BC-CJ	bc62110_8	2306604	1213978	0	0.082762	0.003065	6/22/2010
BC-CJ	bc62110_8	2306414	1213986	0	0.040581	0.002865	6/22/2010
BC-CJ	bc62110_8	2306210	1213994	0	0.063033	0.004074	6/22/2010

BC-CJ	bc62110_8	2306403	1214200	0	0	0.002633	6/22/2010
BC-CJ	bc62110_9	2306579	1214197	0	0	0.002869	6/22/2010
BC-CJ	bc62110_9	2306789	1214200	0	0.103746	0.002862	6/22/2010
BC-CJ	bc62110_9	2306824	1214408	0	0.240274	0.00309	6/22/2010
BC-CJ	bc62110_9	2306811	1214576	0	0.261177	0.003318	6/22/2010
BC-CJ	bc62110_9	2306802	1214773	0	0.199554	0.003077	6/22/2010
BC-CJ	bc62110_9	2306786	1214961	0	0.136112	0.003314	6/22/2010
BC-CJ	bc62110_9	2306828	1215175	0	0.062605	0.00256	6/22/2010
BC-CJ	bc62110_9	2306597	1215016	0	0.065509	0.002356	6/22/2010
BC-CJ	bc62110_9	2306591	1214782	0	0.065988	0.002121	6/22/2010
BC-CJ	bc62110_9	2306613	1214577	0	0.094033	0.003308	6/22/2010
BC-CJ	cj61410_01	2311158	1215956	0	0.581901	0.00051	6/14/2010
BC-CJ	cj61410_02	2311352	1215946	2.572974	0.81197	0.000254	6/14/2010
BC-CJ	cj61410_03	2311547	1215946	0.000251	0.216965	0.001257	6/14/2010
BC-CJ	cj61410_04	2311772	1215965	0.045444	0	0	6/14/2010
BC-CJ	cj61410_05	2311960	1215959	0	0.053183	0.002237	6/14/2010
BC-CJ	cj61410_06	2311772	1215766	0.000248	0.034226	0.000744	6/14/2010
BC-CJ	cj61410_07	2311562	1215765	0	0.111253	0.001734	6/14/2010
BC-CJ	cj61410_08	2311361	1215761	0	0.207285	0.000992	6/14/2010
BC-CJ	cj61410_09	2311185	1215759	0	0.093237	0.000992	6/14/2010
BC-CJ	cj61410_10	2311180	1215570	0	0.327159	0.000496	6/14/2010
BC-CJ	cj61410_11	2311351	1215548	0	0.176347	0	6/14/2010
BC-CJ	cj61410_12	2311565	1215556	0	0.027196	0.000247	6/14/2010
BC-CJ	cj61410_13	2311738	1215537	0	0.103175	0	6/14/2010
BC-CJ	cj61410_14	2311522	1215364	0	0.053713	0	6/14/2010
BC-CJ	cj61410_15	2311366	1215357	0	0.066686	0	6/14/2010
BC-CJ	cj61410_16	2310950	1215950	0.000247	0.192522	0.000247	6/14/2010
BC-CJ	cj61410_17	2310948	1215748	0	0.291178	0	6/14/2010
BC-CJ	cj61410_18	2310772	1215746	0.000248	0.144333	0	6/14/2010
BC-CJ	cj61410_19	2310753	1215945	0	0.031999	0.000248	6/14/2010
BC-CJ	cj61410_20	2310933	1216183	0	0.09505	0.000745	6/14/2010
BC-CJ	cj61410_21	2310776	1215136	0	0.103914	0	6/15/2010
BC-CJ	cj61410_22	2310961	1215152	0.231184	0.207189	0.000258	6/15/2010
BC-CJ	cj61410_23	2310590	1215155	0.028834	0.276502	0.00103	6/15/2010
BC-CJ	cj61410_24	2310590	1214944	0	0.049404	0	6/15/2010
BC-CJ	cj61410_25	2310760	1214749	0	0.006157	0	6/15/2010
BC-CJ	cj61410_26	2310534	1214725	0	0.179145	0.001019	6/15/2010
BC-CJ	cj61410_27	2310538	1214515	0	0.661551	0.001528	6/15/2010
BC-CJ	cj61410_28	2310559	1214353	0	0.242426	0.000763	6/15/2010
BC-CJ	cj61410_29	2310596	1214155	0	0.168033	0.001779	6/15/2010
BC-CJ	cj61410_30	2310764	1214142	0	0.099896	0	6/15/2010
BC-CJ	cj61410_31	2310753	1214362	0	0.005324	0	6/15/2010
BC-CJ	cj61410_32	2310770	1214556	0	0.005324	0	6/15/2010
BC-CJ	cj61410_33	2310926	1214557	0	0.024811	0	6/15/2010
BC-CJ	cj61410_34	2310876	1214386	0	0.024811	0	6/15/2010
BC-CJ	cj61410_35	2310943	1214749	0	0.032337	0.000505	6/15/2010
BC-CJ	cj61410_36	2310979	1214948	0.001764	0.33465	0.002016	6/15/2010
BC-CJ	cj61410_37	2311154	1214938	0	0.007542	0.001006	6/15/2010
BC-CJ	cj61410_38	2311154	1214765	0	0.007542	0.001006	6/15/2010
BC-CJ	cj61410_39	2310168	1214187	0	0.261706	0.003005	6/15/2010
BC-CJ	cj61410_40	2310338	1214167	0	0.155243	0.001244	6/15/2010

BC-CJ	cj61410_41	2310332	1214367	8.335622	1.474341	0.001492	6/15/2010
BC-CJ	cj61410_42	2310333	1214551	0.008194	0.124149	0.000745	6/15/2010
BC-CJ	cj61410_43	2310297	1214743	0	0.230872	0.00124	6/15/2010
BC-CJ	cj61410_44	2310314	1215174	0	0.057141	0.002226	6/15/2010
BC-CJ	cj61410_45	2310182	1215152	0	0.662588	0.001235	6/15/2010
BC-CJ	cj61410_46	2310135	1214971	8.676637	1.078577	0.000739	6/15/2010
BC-CJ	cj61410_47	2310163	1214756	0	0.319217	0.001722	6/15/2010
BC-CJ	cj61410_48	2310143	1214547	0.503995	0.795678	0.000983	6/15/2010
BC-CJ	cj61410_49	2310156	1214381	6.134162	1.451348	0.006138	6/15/2010
BC-CJ	cj61410_50	2311179	1216169	0	1.075852	0.001234	6/15/2010
BC-CJ	cj61410_51	2311370	1216357	0	0.370102	0.001969	6/15/2010
BC-CJ	cj61410_52	2311554	1216482	0	0.033847	0.001717	6/15/2010
BC-CJ	cj61410_53	2311731	1216747	0	0.221344	0.008062	6/15/2010
BC-CJ	cj61410_54	2311778	1216919	0	0.064076	0.001705	6/15/2010
BC-CJ	cj61410_55	2311938	1217146	0	0.035402	0.001455	6/15/2010
BC-CJ	cj61410_56	2312123	1217341	0	0.068721	0.002178	6/15/2010
BC-CJ	cj61410_57	2312333	1217529	0	0.004103	0.001207	6/15/2010
BC-CJ	cj61410_58	2312505	1217749	0	0.145836	0.002411	6/15/2010
BC-CJ	cj61410_59	2312527	1218043	0	0.293025	0.002889	6/15/2010
BC-CJ	cj61410_60	2312788	1218004	0	0.011785	0.000962	6/15/2010
BC-CJ	cj61410_61	2313020	1217989	0	0.042109	0.001675	6/15/2010
BC-CJ	cj61410_62	2313212	1217988	0	0.068418	0.000957	6/15/2010
BC-CJ	cj61410_63	2313408	1217990		0.000717	0.000478	6/15/2010
BC-CJ	cj61410_64	2313598	1217997	0	0	0.000717	6/15/2010
BC-CJ	cj61410_65	2313171	1217756	0	0.138477	0.001196	6/15/2010
BC-CJ	cj61410_66	2312975	1217740	0	0.525977	0.000239	6/15/2010
BC-CJ	cj61410_67	2312759	1217751	0	0.107801	0.002156	6/15/2010
BC-CJ	cj61410_68	2312524	1217546	0	0.184248	0.000718	6/15/2010
BC-CJ	cj61410_69	2312368	1217368	0	0.226049	0.001199	6/15/2010
BC-CJ	cj61410_70	2312166	1217155	0	0.026154	0.00048	6/15/2010
BC-CJ	cj61410_71	2311979	1216955	0	0.398417	0.001441	6/15/2010
BC-CJ	cj61410_72	2311928	1216740	0	0.305864	0.000961	6/15/2010
BC-CJ	cj61410_73	2311734	1216558	0	0.984994	0.003357	6/15/2010
BC-CJ	cj61410_74	2311536	1216377	0	0.767105	0.000721	6/15/2010
BC-CJ	cj61410_75	2311364	1216190	0.837535	1.821712	0.001202	6/15/2010
BC-CJ	cj61410_76	2311951	1216169	0.000238	0.1072	0.007861	6/15/2010
BC-CJ	cj61410_77	2311762	1216154	0	0.31614	0.005241	6/15/2010
BC-CJ	cj61410_78	2311577	1216134	0	0.133177	0.006205	6/15/2010
BC-CJ	cj61410_79	2311800	1216320	0	0.142803	0.00597	6/15/2010
BC-CJ	cj61410_80	2312162	1216360	0.010246	0.227806	0.007387	6/15/2010
BC-CJ	cj61410_81	2311970	1216389	0	0.065353	0.001901	6/15/2010
BC-CJ	cj61410_82	2311986	1216542	0	0.0675	0.001901	6/15/2010
BC-CJ	cj61410_83	2312171	1216542	0	0.270336	0.002615	6/15/2010
BC-CJ	cj61410_84	2312355	1216562	0	0.009963	0.002609	6/15/2010
BC-CJ	cj61410_85	2312367	1216747	0	0	0.001897	6/15/2010
BC-CJ	cj61410_86	2312164	1216746	0	0.007352	0.000949	6/15/2010
BC-CJ	cj61410_87	2312196	1216952	0	0.100194	0.006395	6/15/2010
BC-CJ	cj61410_88	2312372	1216947	0.000949	0.037002	0.002372	6/15/2010
BC-CJ	cj61410_89	2312572	1216947	0	0.030072	0.008998	6/15/2010
BC-CJ	cj61410_90	2312727	1217150	0	0	0.001894	6/15/2010
BC-CJ	cj61410_91	2312968	1217343	0	0.113774	0.001419	6/15/2010

BC-CJ	cj61410_92	2313182	1217345	0	0.056518	0.002128	6/15/2010
BC-CJ	cj61410_93	2313177	1217557	0	0.20827	0	6/15/2010
BC-CJ	cj61410_94	2312958	1217548	0	0.266898	0.000473	6/15/2010
BC-CJ	cj61410_95	2312755	1217531	0	0.407747	0.000472	6/15/2010
BC-CJ	cj61410_96	2312756	1217359	0	0.195728	0.00591	6/15/2010
BC-CJ	cj61410_97	2312568	1217350	0.000236	0.346692	0.000945	6/15/2010
BC-CJ	cj61410_98	2312554	1217162	0	0.151581	0.002128	6/15/2010
BC-CJ	cj61410_99	2312399	1217144	0	0.040905	0.00331	6/15/2010
FR	fr62510_01	2331981	1234936	0	0.007775	0	6/25/2010
FR	fr62510_02	2332176	1234981	0	0	0.002905	6/25/2010
FR	fr62510_03	2332359	1234946	0.121439	0.209803	0	6/25/2010
FR	fr62510_04	2332561	1234936	0	0.154063	0	6/25/2010
FR	fr62510_05	2332757	1234946	0	0	0.0036	6/25/2010
FR	fr62510_06	2332741	1235137	0	0.139382	0	6/25/2010
FR	fr62510_07	2332733	1235335	0	0	0.000477	6/25/2010
FR	fr62510_08	2332769	1235554	0	0.043484	0	6/25/2010
FR	fr62510_09	2332961	1235552	0	0	0	6/25/2010
FR	fr62510_10	2333164	1235552	0	0.226102	0.001413	6/25/2010
FR	fr62510_11	2333159	1235759	0	0	0	6/25/2010
FR	fr62510_12	2333177	1235953	0	1.297256	0.001175	6/25/2010
FR	fr62510_13	2332959	1235963	0	0.090146	0.000468	6/25/2010
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FR	fr62510_17	2332598	1235342	0.000471	0.183868	0	6/25/2010
FR	fr62510_18	2332594	1235140	0	0.120067		6/25/2010
FR	fr62510_19	2332429	1235523	0	0.33208	0	6/25/2010
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TC-PR	bp70710_2	2389485	1238660	0	0.191104	0.002944	7/14/2010
TC-PR	bp70710_2	2389467	1238613	4.598951	0.609423	0	7/14/2010
TC-PR	bp70710_2	2389438	1238606	0	0.232067		7/14/2010
TC-PR	bp70710_2	2389477	1238548	0	0.175625	0.004403	7/14/2010
TC-PR	bp70710_2	2389156	1238163	0.000244	0.051556	0.001466	7/14/2010
TC-PR	bp70710_2	2380173	1241523	0	0.209865	0.005734	7/7/2010
TC-PR	bp70710_2	2388962	1238149	0	0	0.004148	7/14/2010
TC-PR	bp70710_2	2388751	1238149	0	0.704943	0.0078	7/14/2010
TC-PR	bp70710_2	2388561	1238146	0.000243	0.186189	0.004138	7/14/2010

TC-PR	bp70710_2	2388364	1238154	0	0.262786	0.003403	7/14/2010
TC-PR	bp70710_2	2388276	1238237	1.903843	0.373778	0.001214	7/14/2010
TC-PR	bp70710_2	2387560	1237992	28.37474	0.506787	0	7/14/2010
TC-PR	bp70710_2	2387325	1238314	0	0.230289	0	7/14/2010
TC-PR	bp70710_2	2387342	1237993	0	0.299773	0.00072	7/14/2010
TC-PR	bp70710_2	2386972	1237766	0	0.19186	0	7/14/2010
TC-PR	bp70710_2	2389485	1238029	0.741974	0	0.002619	7/14/2010
TC-PR	bp70710_2	2380370	1241571	0.031121	0.125169	0.003204	7/7/2010
TC-PR	bp70710_2	2389514	1238046	0	0.498869	0.011176	7/14/2010
TC-PR	bp70710_2	2389482	1238066	0	0.927587	0.009031	7/14/2010
TC-PR	bp70710_2	2389454	1238031	0	0.088845	0.009027	7/14/2010
TC-PR	bp70710_2	2389487	1237996	0	0.394924	0.00475	7/14/2010
TC-PR	bp70710_2	2389747	1238392	0.058446	0.226686	0.003549	7/14/2010
TC-PR	bp70710_2	2380556	1241556	0	0.094175	0.004114	7/7/2010
TC-PR	bp70710_2	2380758	1241529	0	0.388792	0.001824	7/7/2010
TC-PR	bp70710_2	2380972	1241546	0	0.186085	0.000683	7/7/2010
TC-PR	bp70710_2	2381161	1241565	0	0.093509	0.002048	7/7/2010
TC-PR	bp70710_2	2381134	1241349	0	0.075521	0.00182	7/7/2010
TC-PR	bp70710_2	2380967	1241359	0	0.171282	0.003421	7/7/2010
TC-PR	bp70710_2	2379965	1241351	0	0.038533	0	7/8/2010
TC-PR	bp70710_3	2380163	1241367	0	0.172121	0.000736	7/8/2010
TC-PR	bp70710_3	2380378	1241353	0	0.169844		7/8/2010
TC-PR	bp70710_3	2380561	1241350	0.000487	0.230241	0	7/8/2010
TC-PR	bp70710_3	2380740	1241357	0	0.194823	0	7/8/2010
TC-PR	bp70710_3	2380359	1241168	0.000243	0.142397	0.000728	7/8/2010
TC-PR	bp70710_3	2380547	1241154	0	0.07784	0	7/8/2010
TC-PR	bp70710_3	2380764	1241160	0	0.091075	0.001214	7/8/2010
TC-PR	bp70710_3	2380959	1241171	0	0.175593	0.000242	7/8/2010
TC-PR	bp70710_3	2381126	1241145	0.000484	0.101947	0.003148	7/8/2010
TC-PR	bp70710_3	2381362	1241126	0.000242	0.064611	0	7/8/2010
TC-PR	bp70710_4	2381549	1241161	0	0.143058	0.002658	7/8/2010
TC-PR	bp70710_4	2381760	1240942	0	0.464199	0.001447	7/8/2010
TC-PR	bp70710_4	2381577	1240942	0	0.257472	0.00194	7/8/2010
TC-PR	bp70710_4	2381380	1240938	0	0.179525	0.000485	7/8/2010
TC-PR	bp70710_4	2381166	1240905	0.000241	0.117037	0.001448	7/8/2010
TC-PR	bp70710_4	2380982	1240993	0.000242	0.173433	0.001208	7/8/2010
TC-PR	bp70710_4	2380794	1240974	0	0.291465	0.001201	7/8/2010
TC-PR	bp70710_4	2380947	1240769	0	0.291441	0.003355	7/8/2010
TC-PR	bp70710_4	2381164	1240748	0	0.033944	0.001434	7/8/2010
TC-PR	bp70710_4	2381343	1240770	0.000479	0.369207	0.001918	7/8/2010
TC-PR	bp70710_5	2381558	1240762	1.03574	0.963897	0.002155	7/8/2010
TC-PR	bp70710_5	2381761	1240744	24.10174	1.23735	0.001916	7/8/2010
TC-PR	bp70710_5	2381951	1240755	0	0	0.000239	7/8/2010
TC-PR	bp70710_5	2382139	1240746	0.000239	0.307355	0.001194	7/8/2010
TC-PR	bp70710_5	2382349	1240765	0	0.397112	0.001667	7/8/2010
TC-PR	bp70710_5	2382365	1240555	0	0.281569	0.00238	7/8/2010
TC-PR	bp70710_5	2382355	1240339	0.000241	0.497987	0.000963	7/8/2010
TC-PR	bp70710_5	2382378	1240147	0.000477	0.438947		7/8/2010
TC-PR	bp70710_5	2382152	1240145	0	0.386067	0.000715	7/8/2010
TC-PR	bp70710_5	2381961	1240145	0	0.154042	0.000718	7/8/2010
TC-PR	bp70710_6	2381761	1240142	0	0.153879	0.000718	7/8/2010

TC-PR	bp70710_6	2381539	1240340	0.000238	0.819793	0.000714	7/8/2010
TC-PR	bp70710_6	2381363	1240385	0.000712	0	0.001662	7/8/2010
TC-PR	bp70710_6	2381740	1240349	0	0.36294	0.00308	7/8/2010
TC-PR	bp70710_6	2381947	1240343	0	0.11712		7/8/2010
TC-PR	bp70710_6	2382161	1240348	0	0.159454	0.001893	7/8/2010
TC-PR	bp70710_6	2382163	1240545	0	0	0	7/8/2010
TC-PR	bp70710_6	2381973	1240550	0	0.24875	0.000707	7/8/2010
TC-PR	bp70710_6	2381760	1240540	0.00047	0.341648	0.002351	7/8/2010
TC-PR	bp70710_6	2381584	1240536	0.000235	0.110847	0.002118	7/8/2010
TC-PR	bp70710_7	2381364	1240544	0	0.181239	0.00141	7/8/2010
TC-PR	bp70710_7	2381189	1240535	0	0.221208	0.002113	7/8/2010
TC-PR	sftc_01	2373758	1243215	0	0.384633	0.007897	6/28/2010
TC-PR	sftc_02	2373849	1243231	0	0.333222	0.007209	6/28/2010
TC-PR	sftc_03	2373924	1243240	0.000232	1.60749	0.000232	6/28/2010
TC-PR	sftc_04	2373970	1243235	0.000232	2.462453	0.00093	6/28/2010
TC-PR	sftc_05	2374028	1243274	0	0.851326	0.018598	6/28/2010
TC-PR	sftc_06	2374067	1243297	0.000467	0.471581	0.008867	6/28/2010
TC-PR	sftc_07	2374095	1243335	0.000234	0.403307	0.001638	6/28/2010
TC-PR	sftc_08	2374115	1243347	3.293778	0.362848	0.002326	6/28/2010
TC-PR	sftc_09	2374129	1243332	11.58588	1.362743	0.004414	6/28/2010
TC-PR	sftc_10	2374124	1243303	2.106607	1.44382	0.004646	6/28/2010
TC-PR	sftc_11	2374080	1243230	0	0.399526	0.006272	6/28/2010
TC-PR	sftc_12	2374156	1243296	216.6733	0.636467	0.002091	6/28/2010
TC-PR	sftc_13	2374209	1243333	2.724154	3.184683	0.001858	6/28/2010
TC-PR	sftc_14	2374250	1243354	0.618841	0.702933	0.001161	6/28/2010
TC-PR	sftc_15	2374247	1243406	26.54225	1.312761	0.001393	6/28/2010
TC-PR	sftc_16	2374228	1243447	0	0.213291	0.001393	6/28/2010
TC-PR	sftc_17	2374195	1243500	0	0.295915	0.000232	6/28/2010
TC-PR	sftc_18	2374165	1243474	0	0.515807	0.002088	6/28/2010
TC-PR	sftc_19	2374137	1243445	0	0.259412	0.000928	6/28/2010
TC-PR	sftc_20	2374137	1243395	102.72	0.985906	0.000464	6/28/2010
TC-PR	sftc_21	2374114	1243382	1.675346	0.692615	0.003708	6/28/2010
TC-PR	sftc_22	2374114	1243429	0	0.644047	0.000695	6/28/2010
TC-PR	sftc_23	2374084	1243492	0	0.077518	0.002314	6/28/2010
TC-PR	sftc_24	2374054	1243532	6.861113	2.344167	0	6/28/2010
TC-PR	sftc_25	2374083	1243546	0	0.251601	0.005088	6/28/2010
TC-PR	sftc_26	2374029	1243588	0	0.123664	0.004623	6/28/2010
TC-PR	sftc_27	2373989	1243529	40.2257	0.843666	0	6/28/2010
TC-PR	sftc_28	2373942	1243478	8.064012	1.122887	0.000462	6/28/2010
TC-PR	sftc_29	2373952	1243427	15.02576	1.462636	0.000461	6/28/2010
TC-PR	sftc_30	2373964	1243364	0	0.163309	0.003921	6/28/2010
TC-PR	sftc_31	2373901	1243324	6.624547	0.911409	0	6/28/2010
TC-PR	sftc_32	2373814	1243293	21.79492	1.539392	0	6/28/2010
TC-PR	sftc_33	2373746	1243280	3.049466	3.221377	0	6/28/2010
TC-PR	sftc_34	2373707	1243281	0.00023	0.187812	0.000691	6/28/2010
TC-PR	sftc_35	2373797	1243260	0	0.076944	0	6/28/2010
TC-PR	sftc_36	2373922	1243298	0.002534	2.6215	0.000691	6/28/2010
TC-PR	sftc_37	2374021	1243366	0.289752	0.232171	0	6/28/2010
TC-PR	sftc_38	2374161	1243374	59.62549	0.144204	0	6/28/2010
TC-PR	sftc_39	2374191	1243379	0	0.245656	0.000922	6/28/2010
TC-PR	sftc_40	2374030	1243409	0	0.109958	0	6/28/2010

TC-PR	sftc_41	2374000	1243468	0	0.001383	0.000461	6/28/2010
TC-PR	tc070610_(	2375133	1243525	0	0.111654	0	7/6/2010
TC-PR	tc070610_(	2375138	1243387	0	0	0.000706	7/6/2010
TC-PR	tc070610_(	2375164	1243341	0	0.04659	0.000468	7/6/2010
TC-PR	tc070610_(	2375149	1243153	0	0.024573	0	7/6/2010
TC-PR	tc070610_(	2375165	1242935	0	0.020526	0.001166	7/6/2010
TC-PR	tc070610_(	2375183	1242809	0	0.045175	0.000699	7/6/2010
TC-PR	tc070610_(	2375360	1242945	0	0.248375	0.00093	7/6/2010
TC-PR	tc070610_(	2375279	1243020	0	0.264615	0.002323	7/6/2010
TC-PR	tc070610_(	2375248	1243076	0	0.080895	0.001162	7/6/2010
TC-PR	tc070610_1	2375330	1243111	0	0.464741	0.002557	7/6/2010
TC-PR	tc070610_1	2375380	1243159	0.000232	0.038578	0.000232	7/6/2010
TC-PR	tc070610_1	2374958	1243756	0	0.098249	0.000731	7/7/2010
TC-PR	tc070610_1	2375160	1243764	0	0.1625	0.001943	7/7/2010
TC-PR	tc070610_1	2375349	1243769	0	0.113871	0.001214	7/7/2010
TC-PR	tc070610_1	2375526	1243779	0.000485	0.221619	0.00097	7/7/2010
TC-PR	tc070610_1	2375767	1243747	0	0.035071	0.000242	7/7/2010
TC-PR	tc070610_1	2375952	1243778	0	0.118933	0	7/7/2010
TC-PR	tc070610_1	2376153	1243728	0	0.085058	0	7/7/2010
TC-PR	tc070610_1	2376193	1243556	0	0.083795	0.000239	7/7/2010
TC-PR	tc070610_2	2376174	1243372	0	0.519196	0.001909	7/7/2010
TC-PR	tc070610_2	2376142	1243344	3.890214	2.256733	0	7/7/2010
TC-PR	tc070610_2	2376177	1243154	0	0.237936	0.000474	7/7/2010
TC-PR	tc070610_2	2376168	1242973	0	0.132793	0.000236	7/7/2010
TC-PR	tc070610_2	2376154	1242746	0.004481	0.213458	0.000236	7/7/2010
TC-PR	tc070610_2	2376134	1242529	0	0.190392	0.000235	7/7/2010
TC-PR	tc070610_2	2375959	1242558	0	0.312937	0.000236	7/7/2010
TC-PR	tc070610_2	2375733	1242568	0	0.156775	0.000236	7/7/2010
TC-PR	tc070610_2	2375553	1242542	0.002126	0.125686	0.000236	7/7/2010
TC-PR	tc070610_2	2375362	1242546	0	0.211268	0.000236	7/7/2010
TC-PR	tc070610_3	2375368	1242699	0	0.215267	0.000236	7/7/2010
TC-PR	tc070610_3	2375537	1242743	0	0.893514	0	7/7/2010
TC-PR	tc070610_3	2375750	1242710	0	0.429449	0	7/7/2010
TC-PR	tc070610_3	2375964	1242755	0	0.298772	0	7/7/2010
TC-PR	tc070610_3	2375954	1242964	0	0.573794	0	7/7/2010
TC-PR	tc070610_3	2375954	1243128	0	0.142449	0.00047	7/7/2010
TC-PR	tc070610_3	2375933	1243363	0	0.109839	0	7/7/2010
TC-PR	tc070610_3	2375982	1243548	4.786157	0.694134	0	7/7/2010
TC-PR	tc070610_3	2375734	1243489	4.598259	1.812458	0.000234	7/7/2010
TC-PR	tc070610_3	2375768	1243358	0	0.115911	0.000235	7/7/2010
TC-PR	tc070610_4	2375756	1243109	0.001172	0.643305	0.000234	7/7/2010
TC-PR	tc070610_4	2375757	1242941	0	0.226029	0	7/7/2010
TC-PR	tc070610_4	2375563	1242934	0	0.334476	0	7/7/2010
TC-PR	tc070610_4	2375563	1243149	0	0.115655	0	7/7/2010
TC-PR	tc070610_4	2375571	1243316	0	0.025187	0.000706	7/7/2010
TC-PR	tc070610_4	2375609	1243543	0	0.369768	0.000235	7/7/2010
TC-PR	tc070610_4	2375370	1243532	0	0.090417	0.000235	7/7/2010
TC-PR	tc070610_4	2375355	1243335	0	0.032987	0.000236	7/7/2010
TC-PR	tc62810_01	2370558	1243564	0	0	0	6/28/2010
TC-PR	tc62810_02	2370574	1243367	0	0	0.003208	6/28/2010
TC-PR	tc62810_03	2370778	1243396	0	0.249119	0.000738	6/28/2010

TC-PR	tc62810_04	2370965	1243366	0	0.264853	0.006091	6/28/2010
TC-PR	tc62810_05	2371174	1243356	0	0.220945	0.002209	6/28/2010
TC-PR	tc62810_06	2371376	1243349	0	0.293424	0.00465	6/28/2010
TC-PR	tc62810_07	2371569	1243351	0.000244	0.053753	0.000244	6/28/2010
TC-PR	tc62810_08	2371763	1243364	0.000491	0.059674	0.001228	6/28/2010
TC-PR	tc62810_09	2371965	1243368	0	0.030029	0.001221	6/28/2010
TC-PR	tc62810_10	2372171	1243363	20.7891	1.215858	0.00049	6/28/2010
TC-PR	tc62810_10	2371978	1243531	0	2.490976	0.000692	6/29/2010
TC-PR	tc62810_10	2372140	1243541	0	0.004865	0.003243	6/29/2010
TC-PR	tc62810_10	2372348	1243552	0	0.002779	0.002084	6/29/2010
TC-PR	tc62810_10	2372546	1243540	0	0.212272	0.001389	6/29/2010
TC-PR	tc62810_10	2372771	1243538	0	0.049059	0.000694	6/29/2010
TC-PR	tc62810_10	2372981	1243558	0	0.01364	0.002543	6/29/2010
TC-PR	tc62810_10	2373159	1243573	0	0.102153	0.001618	6/29/2010
TC-PR	tc62810_10	2373359	1243571	0	0	0.001386	6/29/2010
TC-PR	tc62810_10	2373342	1243722	0	0	0.001849	6/29/2010
TC-PR	tc62810_11	2372380	1243355	0	0.06741	0.00219	6/28/2010
TC-PR	tc62810_11	2372743	1243772	0	0.466397	0.004148	6/29/2010
TC-PR	tc62810_11	2372553	1243745	0	0	0	6/30/2010
TC-PR	tc62810_11	2372334	1243731	0	0	0.001155	6/29/2010
TC-PR	tc62810_11	2372175	1243744	0	0.039274	0.000697	6/29/2010
TC-PR	tc62810_11	2372164	1243956	0	0.092605	0.00254	6/29/2010
TC-PR	tc62810_11	2372349	1243944	0	0.087266	0.001612	6/29/2010
TC-PR	tc62810_11	2372523	1243975	0	0.110815	0	6/30/2010
TC-PR	tc62810_11	2372759	1243980	0	0.142393	0	6/30/2010
TC-PR	tc62810_12	2372581	1243353	0	0.069251	0.001458	6/28/2010
TC-PR	tc62810_12	2373187	1243951	0	0.257372	0.001147	6/29/2010
TC-PR	tc62810_12	2373344	1243975	0	1.274128	0.001377	6/29/2010
TC-PR	tc62810_12	2373163	1243757	0	0	0	6/30/2010
TC-PR	tc62810_12	2372984	1243764	0	0	0	6/30/2010
TC-PR	tc62810_12	2372982	1243973	0	0	0	6/30/2010
TC-PR	tc62810_12	2372965	1244178	0	0	0	6/30/2010
TC-PR	tc62810_12	2372762	1244088	0	0	0	6/30/2010
TC-PR	tc62810_12	2372557	1244106	0	0.086852	0.000244	6/30/2010
TC-PR	tc62810_12	2373049	1244176	0.223392	0.474232	0	6/30/2010
TC-PR	tc62810_12	2376971	1242157	0.012789	0.010421	0	6/30/2010
TC-PR	tc62810_13	2372765	1243359	0.000243	0.284761	0.002913	6/28/2010
TC-PR	tc62810_13	2376968	1242360	0.309007	0.504343	0	6/30/2010
TC-PR	tc62810_13	2376965	1242523	0	0.96133	0.001648	6/30/2010
TC-PR	tc62810_13	2376953	1242760	0.006118	0.051769	0.000235	6/30/2010
TC-PR	tc62810_13	2376933	1242955	0	0.114376	0.00047	6/30/2010
TC-PR	tc62810_13	2376964	1243136	0.018995	0.118897	0	6/30/2010
TC-PR	tc62810_13	2376778	1243182	0	0.083219	0	6/30/2010
TC-PR	tc62810_13	2376751	1242955	0	0.014313	0.000235	6/30/2010
TC-PR	tc62810_13	2376787	1242757	0	0.243641	0.000469	6/30/2010
TC-PR	tc62810_13	2376876	1242797	13.4653	1.070829	0.000234	6/30/2010
TC-PR	tc62810_13	2376762	1242556	0	0.213156	0	6/30/2010
TC-PR	tc62810_14	2372960	1243359	0	0.060168	0.002184	6/28/2010
TC-PR	tc62810_14	2377166	1242145	0.000235	0.1187	0	6/30/2010
TC-PR	tc62810_14	2377159	1242355	0.000702	0.27437	0	6/30/2010
TC-PR	tc62810_14	2377172	1242446	10.30099	1.59148	0	6/30/2010

TC-PR	tc62810_14	2377180	1242554	0	1.209927	0.001872	6/30/2010
TC-PR	tc62810_14	2377167	1242740	0	0.345471	0.000234	6/30/2010
TC-PR	tc62810_14	2377165	1242907	1.848484	1.329145	0	6/30/2010
TC-PR	tc62810_14	2377169	1242968	0	0	0.000466	6/30/2010
TC-PR	tc62810_14	2377162	1243125	0	0	0	6/30/2010
TC-PR	tc62810_14	2377355	1243129	0	0.072161	0.000467	6/30/2010
TC-PR	tc62810_14	2377370	1242947	0	0.085313	0.000465	6/30/2010
TC-PR	tc62810_15	2373180	1243359	0.012134	0.163317	0.005824	6/28/2010
TC-PR	tc62810_15	2377369	1242764	0	0.100262	0.000931	6/30/2010
TC-PR	tc62810_15	2377359	1242562	0.481542	0.761237	0	6/30/2010
TC-PR	tc62810_15	2377348	1242333	0	0	0.000233	6/30/2010
TC-PR	tc62810_15	2377355	1242165	0	0.098614	0	6/30/2010
TC-PR	tc62810_15	2377553	1242138	0.149422	0.211292	0.001167	6/30/2010
TC-PR	tc62810_15	2377562	1242348	0.020976	0.030532	0	6/30/2010
TC-PR	tc62810_15	2377638	1242509	10.04881	0.894977	0	6/30/2010
TC-PR	tc62810_15	2376349	1242728	0	0.496267	0.002813	6/30/2010
TC-PR	tc62810_15	2376353	1242951	0	0	0.001163	6/30/2010
TC-PR	tc62810_15	2376369	1243126	0	0.529514	0	6/30/2010
TC-PR	tc62810_16	2373359	1243360	0	0.438867	0.004367	6/28/2010
TC-PR	tc62810_16	2376336	1243327	0	0.01746	0	6/30/2010
TC-PR	tc62810_16	2376333	1243548	0	0.071734	0.000233	6/30/2010
TC-PR	tc62810_16	2376357	1243743	0	0	0	6/30/2010
TC-PR	tc62810_16	2376547	1243342	0	0.143028	0.000233	6/30/2010
TC-PR	tc62810_16	2376573	1243143	0	0.041004	0	6/30/2010
TC-PR	tc62810_16	2377569	1242524	0	0.413731	0	7/2/2010
TC-PR	tc62810_16	2377563	1242750	0.000245	0	0	7/2/2010
TC-PR	tc62810_16	2377554	1242951	0	0.166588	0	7/2/2010
TC-PR	tc62810_16	2377556	1243151	0	1.442963	0	7/2/2010
TC-PR	tc62810_16	2377747	1243360	0	1.297361	0	7/2/2010
TC-PR	tc62810_17	2373559	1243363	0	0.222346	0.000242	6/28/2010
TC-PR	tc62810_17	2377945	1243355	0	0	0.000239	7/2/2010
TC-PR	tc62810_17	2378176	1243358	0	0.016904	0.000952	7/2/2010
TC-PR	tc62810_17	2378198	1243153	0	0.049475	0	7/2/2010
TC-PR	tc62810_17	2377967	1243157	0	0.115556	0.00143	7/2/2010
TC-PR	tc62810_17	2377774	1243161	0	0.061539	0.00095	7/2/2010
TC-PR	tc62810_17	2377778	1242943	0	0.085201	0	7/2/2010
TC-PR	tc62810_17	2377966	1242935	0	0.016167	0.000713	7/2/2010
TC-PR	tc62810_17	2378169	1242970	0	0.096231	0	7/2/2010
TC-PR	tc62810_17	2378183	1242763	0.013937	0.078427	0	7/2/2010
TC-PR	tc62810_17	2378405	1242756	0	0.101837	0	7/2/2010
TC-PR	tc62810_18	2373758	1243370	2.969578	0.246335	0	6/28/2010
TC-PR	tc62810_18	2378572	1242734	0	0.125923	0	7/2/2010
TC-PR	tc62810_18	2378760	1242727	0	0.001645	0	7/2/2010
TC-PR	tc62810_18	2378953	1242747	0.010075	0	0	7/2/2010
TC-PR	tc62810_18	2379175	1242730	0	0.106049	0	7/2/2010
TC-PR	tc62810_18	2379363	1242757	0.000699	0.234435	0	7/2/2010
TC-PR	tc62810_18	2379569	1242749	0	0.046516	0	7/2/2010
TC-PR	tc62810_18	2379736	1242553	0	0	0.000696	7/2/2010
TC-PR	tc62810_18	2379582	1242539	0.000233	0.100687	0	7/2/2010
TC-PR	tc62810_18	2379361	1242570	0	0.057927	0	7/2/2010
TC-PR	tc62810_18	2379173	1242586	0	0.168321	0.000698	7/2/2010

TC-PR	tc62810_19	2373974	1243380	6.411574	5.317724	0.001694	6/28/2010
TC-PR	tc62810_19	2378994	1242552	0.000466	0.140896	0	7/2/2010
TC-PR	tc62810_19	2378776	1242559	0	0.059658	0	7/2/2010
TC-PR	tc62810_19	2378568	1242581	0.010488	0.100919	0	7/2/2010
TC-PR	tc62810_19	2378374	1242557	0	0.104051	0.0021	7/2/2010
TC-PR	tc62810_19	2378182	1242567	0	0.215383	0	7/2/2010
TC-PR	tc62810_19	2377971	1242781	0	0.058285	0.000936	7/2/2010
TC-PR	tc62810_19	2377791	1242736	0	0.089634	0	7/2/2010
TC-PR	tc62810_19	2377771	1242536	0	0.373431	0.003975	7/2/2010
TC-PR	tc62810_19	2377962	1242532	0.391446	0.129545	0.002108	7/2/2010
TC-PR	tc62810_19	2377795	1242377	0	1.324146	0	7/2/2010
TC-PR	tc62810_20	2374154	1243371	110.5267	0.140119	0.000968	6/28/2010
TC-PR	tc62810_20	2377977	1242362	0	0	0	7/2/2010
TC-PR	tc62810_20	2378147	1242372	0	1.099889	0	7/2/2010
TC-PR	tc62810_20	2378358	1242386	0	0	0.000466	7/2/2010
TC-PR	tc62810_20	2378560	1242369	0	0	0.000232	7/2/2010
TC-PR	tc62810_20	2378756	1242331	0	0	0	7/2/2010
TC-PR	tc62810_20	2378963	1242346	0	0	0.001389	7/2/2010
TC-PR	tc62810_20	2379157	1242377	0	0	0.000694	7/2/2010
TC-PR	tc62810_20	2379357	1242337	0	0.007865	0	7/2/2010
TC-PR	tc62810_20	2379566	1242315	0	0.102878	0	7/2/2010
TC-PR	tc62810_20	2379752	1242305	0	0.118213	0	7/2/2010
TC-PR	tc62810_21	2374258	1243353	0	1.108924	0.000242	6/28/2010
TC-PR	tc62810_21	2379934	1242315	0	0	0.000691	7/2/2010
TC-PR	tc62810_21	2379954	1242097	0	0.12081	0	7/2/2010
TC-PR	tc62810_21	2379773	1242162	0	0	0	7/2/2010
TC-PR	tc62810_21	2379579	1242171	0	0.108293	0	7/2/2010
TC-PR	tc62810_21	2379395	1242146	0	0.211043	0.00023	7/2/2010
TC-PR	tc62810_21	2379186	1242145	0	0.147316	0	7/2/2010
TC-PR	tc62810_21	2378960	1242136	0	0.13411	0.00207	7/2/2010
TC-PR	tc62810_21	2378753	1242132	0	0	0.000459	7/2/2010
TC-PR	tc62810_21	2378575	1242134	0	0.471833	0.00023	7/2/2010
TC-PR	tc62810_21	2378361	1242142	0	0.001379	0	7/2/2010
TC-PR	tc62810_22	2374151	1243291	1.648315	0.855219	0	6/28/2010
TC-PR	tc62810_22	2378182	1242145	0	0.22222	0.00046	7/2/2010
TC-PR	tc62810_22	2377968	1242134	0	0.000921	0	7/2/2010
TC-PR	tc62810_22	2377752	1242144	0	0	0	7/2/2010
TC-PR	tc62810_23	2374019	1243171	0	0.408969	0.000724	6/28/2010
TC-PR	tc62810_24	2373787	1243088	0	0	0.002412	6/28/2010
TC-PR	tc62810_25	2373560	1243147	0	0	0.001686	6/28/2010
TC-PR	tc62810_26	2373372	1243147	0	0	0.000481	6/28/2010
TC-PR	tc62810_27	2373164	1243139	0	0.026901	0.001921	6/28/2010
TC-PR	tc62810_28	2372976	1243150	0	0	0.000719	6/28/2010
TC-PR	tc62810_29	2372756	1243146	0	0	0.001916	6/28/2010
TC-PR	tc62810_30	2372554	1243152	0	0.053169	0.000715	6/28/2010
TC-PR	tc62810_31	2372384	1243151	0	0.37588	0.003093	6/28/2010
TC-PR	tc62810_32	2372209	1243228	0	0.445776	0.002137	6/28/2010
TC-PR	tc62810_33	2372000	1243177	0	0	0	6/28/2010
TC-PR	tc62810_34	2371768	1243149	0.000237	0.03453	0	6/28/2010
TC-PR	tc62810_35	2371558	1243149	0	0.055246	0.000944	6/28/2010
TC-PR	tc62810_36	2371363	1243152	3.606373	1.133283	0	6/28/2010

TC-PR	tc62810_3	2371198	1243159	0	0.004706	0	6/28/2010
TC-PR	tc62810_3	2370972	1243162	0	0.017154	0	6/28/2010
TC-PR	tc62810_3	2370765	1243162	0	0.091958	0	6/28/2010
TC-PR	tc62810_4	2370548	1243099	0	0.00937	0	6/28/2010
TC-PR	tc62810_4	2370596	1242934	0	0.082118	0.000936	6/28/2010
TC-PR	tc62810_4	2370753	1243004	0	0.078183	0	6/28/2010
TC-PR	tc62810_4	2370980	1242986	0	0.081605	0	6/28/2010
TC-PR	tc62810_4	2371204	1242941	0.000933	0.058327	0.001167	6/28/2010
TC-PR	tc62810_4	2371360	1242982	0.000701	0.149713	0.000934	6/28/2010
TC-PR	tc62810_4	2371583	1242934	0	0.119044	0.001637	6/28/2010
TC-PR	tc62810_4	2371756	1242949	0.000468	0.335704	0.008428	6/28/2010
TC-PR	tc62810_4	2371957	1242972	0.000234	0.284077	0.01007	6/28/2010
TC-PR	tc62810_4	2372159	1242968	0.000703	0.239657	0.005857	6/28/2010
TC-PR	tc62810_5	2372344	1242955	0	0.007734	0.002578	6/28/2010
TC-PR	tc62810_5	2372537	1242938	0.314684	0.498387	0.001406	6/28/2010
TC-PR	tc62810_5	2372720	1242939	0	0.513647	0.009377	6/28/2010
TC-PR	tc62810_5	2372944	1242972	0	0.109495	0.000703	6/28/2010
TC-PR	tc62810_5	2373139	1242971	0.000937	0.103273	0.001405	6/28/2010
TC-PR	tc62810_5	2373339	1242936	0	0.047037	0.000234	6/28/2010
TC-PR	tc62810_5	2373538	1242947	0.000468	0.090335	0	6/28/2010
TC-PR	tc62810_5	2373754	1242954	0.000234	0.160454	0.003514	6/28/2010
TC-PR	tc62810_5	2373958	1242965	0.000469	0.319522	0.007965	6/28/2010
TC-PR	tc62810_5	2373957	1242741	0	0.167895	0	6/28/2010
TC-PR	tc62810_6	2373755	1242743	0	0.135988	0.000702	6/28/2010
TC-PR	tc62810_6	2373575	1242735	0	0.140264	0	6/28/2010
TC-PR	tc62810_6	2373350	1242755	0	0.013988	0	6/28/2010
TC-PR	tc62810_6	2373168	1242748	0	0	0	6/28/2010
TC-PR	tc62810_6	2372965	1242725	0	0.053236	0.000465	6/28/2010
TC-PR	tc62810_6	2372750	1242725	0.002554	0	0.000696	6/28/2010
TC-PR	tc62810_6	2372546	1242724	0	0.003482	0	6/28/2010
TC-PR	tc62810_6	2372368	1242744	0	0.090367	0	6/28/2010
TC-PR	tc62810_6	2372151	1242707	0	0.007664	0	6/28/2010
TC-PR	tc62810_6	2373963	1242555	0	0.130426	0.005812	6/28/2010
TC-PR	tc62810_7	2373789	1242550	0	0.138054	0.00767	6/28/2010
TC-PR	tc62810_7	2374071	1242556	0	0.158042	0.001394	6/28/2010
TC-PR	tc62810_7	2371337	1243532	0	0	0	6/29/2010
TC-PR	tc62810_7	2371570	1243528	0	0	0	6/29/2010
TC-PR	tc62810_7	2371778	1243509	0	0.172147	0	6/29/2010
TC-PR	tc62810_7	2371762	1243748	0	0.087296	0.000941	6/29/2010
TC-PR	tc62810_7	2371776	1243954	0	0.089017	0.00164	6/29/2010
TC-PR	tc62810_7	2371772	1244150	0	0.331257	0.001405	6/29/2010
TC-PR	tc62810_7	2371775	1244344	0	0.052172	0.000234	6/29/2010
TC-PR	tc62810_7	2371953	1244349	0	0.369174	0	6/29/2010
TC-PR	tc62810_8	2371771	1244526	0	0.010729	0	6/29/2010
TC-PR	tc62810_8	2372155	1244324				6/29/2010
TC-PR	tc62810_8	2372384	1244346	0	0.073272	0.0007	6/29/2010
TC-PR	tc62810_8	2372590	1244348	0	0.056901	0.000466	6/29/2010
TC-PR	tc62810_8	2372770	1244331	0	0.044038	0	6/29/2010
TC-PR	tc62810_8	2372992	1244345	0	0.047984	0.001398	6/29/2010
TC-PR	tc62810_8	2373177	1244335	0	0.045046	0.000697	6/29/2010
TC-PR	tc62810_8	2373345	1244338	0	0	0.000696	6/29/2010

TC-PR	tc62810_8	2373345	1244128	0	0.021933	0.001385	6/29/2010
TC-PR	tc62810_8	2373155	1244151	0	0.003467	0.000925	6/29/2010
TC-PR	tc62810_9	2372473	1244087	0	1.316122	0	6/30/2010
TC-PR	tc62810_9	2372340	1244138	0	0.080478	0.001156	6/29/2010
TC-PR	tc62810_9	2372167	1244141	0	0.047117	0.003003	6/29/2010
TC-PR	tc62810_9	2371970	1244135	0	0.009659	0.00023	6/29/2010
TC-PR	tc62810_9	2371779	1244134	0	0.113377	0.00069	6/29/2010
TC-PR	tc62810_9	2371953	1243959	0	0.207885	0.00161	6/29/2010
TC-PR	tc62810_9	2371975	1243764	0	0.043117	0.001614	6/29/2010
VP	vp80410_0	2350945	1243937	0	0.702647	0	8/4/2010
VP	vp80410_0	2351147	1243947	0	0.264052	0.001447	8/4/2010
VP	vp80410_0	2351147	1244136	0	0.368176	0.001209	8/4/2010
VP	vp80410_0	2350973	1244150	0	0.532699	0.000954	8/4/2010
VP	vp80410_0	2350772	1244137	0	0.132796	0.005712	8/4/2010
VP	vp80410_0	2350568	1244139	0	0.281738	0.004514	8/4/2010
VP	vp80410_0	2350358	1244129	0	0.140678	0.002364	8/4/2010
VP	vp80410_0	2350176	1244151	0	0.199399	0.001177	8/4/2010
VP	vp80410_0	2349976	1244137	0	0.200864	0.003051	8/4/2010
VP	vp80410_1	2349773	1244149	0	0.341779	0.000468	8/4/2010
VP	vp80410_1	2349564	1244135	0	0.227401	0.001633	8/4/2010
VP	vp80410_1	2349371	1244140	0	0.219868	0.001863	8/4/2010
VP	vp80410_1	2349195	1244144	0.046191	0	0	8/4/2010
VP	vp80410_1	2348980	1244131	0.045572	0.168175	0.001851	8/4/2010
VP	vp80410_1	2348781	1243933	0.06825	0.138345	0.001383	8/4/2010
VP	vp80410_1	2348978	1243930	0	0.424523	0.001381	8/4/2010
VP	vp80410_1	2349163	1243929	0	0.170272	0.003217	8/4/2010
VP	vp80410_1	2349357	1243947	0.186879	0	0.000689	8/4/2010
VP	vp80410_1	2349548	1243948	0	0.329165	0.002292	8/4/2010
VP	vp80410_2	2349762	1243951	0	0.504992	0.001605	8/4/2010
VP	vp80410_2	2349965	1243935	0	0	0.001144	8/4/2010
VP	vp80410_2	2350156	1243945	0	0	0.001142	8/4/2010
VP	vp80410_2	2350357	1243951	0	0.328962	0.002739	8/4/2010
VP	vp80410_2	2350564	1243969	0.024897	0.133164	0.00137	8/4/2010
VP	vp80410_2	2350747	1243943	0.025356	0.135622	0.001396	8/4/2010
VP	vp80410_2	2350961	1243757	0	0.024621	0.003192	8/4/2010
VP	vp80410_2	2350761	1243734	0	0	0.001142	8/4/2010
VP	vp80410_2	2350585	1243749	0.000228	0.052638	0.002962	8/4/2010
VP	vp80410_2	2350370	1243729	0.193096	0.278713	0.002049	8/4/2010
VP	vp80410_3	2350169	1243762	0	0	0.002954	8/4/2010
VP	vp80410_3	2349976	1243754	0	0.184417	0.005444	8/4/2010
VP	vp80410_3	2349792	1243741	0	0.035859	0.001362	8/4/2010
VP	vp80410_3	2349586	1243751	0	0.13773	0.005446	8/4/2010
VP	vp80410_3	2349390	1243743	0	0.411167	0.006123	8/4/2010
VP	vp80410_3	2349192	1243742	0	0.279194	0.002717	8/4/2010
VP	vp80410_3	2348967	1243735	0	0.373183	0.00294	8/4/2010
VP	vp80410_3	2348782	1243745	0	0.348419	0.007009	8/4/2010
VP	VP80410_3	2350871	1243796	0	0.476819	0	8/6/2010
VP	vp80410_3	2351147	1243767	0	0.202171	0	8/9/2010
VP	vp80410_4	2351159	1243545	0	0.28531	0.001434	8/9/2010
VP	vp80410_4	2350979	1243531	0	0.276696	0.002867	8/9/2010
VP	vp80410_4	2350774	1243530	0	0.065633	0.000955	8/9/2010

VP	vp80410_4	2350574	1243528	0	0.191281	0.00262	8/9/2010
VP	vp80410_4	2350343	1243527	0	0.187246	0.008759	8/9/2010
VP	vp80410_4	2350169	1243531	0	0.377058	0.003291	8/9/2010
VP	vp80410_4	2349965	1243538	0	0.307054	0.000935	8/9/2010
VP	vp80410_4	2349768	1243541	0	0.399235	0.002095	8/9/2010
VP	vp80410_4	2349565	1243530	0.051657	0.302993	0.00417	8/9/2010
VP	vp80410_4	2349373	1243542	0	1.01711	0.000693	8/9/2010
VP	vp80410_5	2349174	1243543	0	0.234767	0.001605	8/9/2010
VP	vp80410_5	2352342	1243554	0	0.013321	0.002067	8/9/2010
VP	vp80410_5	2352342	1243344	0.107821	0.209665	0.003678	8/9/2010
VP	vp80410_5	2352368	1243155	0.077784	0.619964	0.002539	8/9/2010
VP	vp80410_5	2352359	1242920	0	0.095456	0.00208	8/9/2010
VP	vp80410_5	2352386	1242741	0	0	0.002318	8/9/2010
VP	vp80410_5	2352357	1242554	0	0.016258	0.000697	8/9/2010
VP	vp80410_5	2352548	1242537	0	0.221575	0.003488	8/9/2010
VP	vp80410_5	2352755	1242547	0	0.134215	0.001861	8/9/2010
VP	vp80410_5	2352968	1242562	0	0.015605	0.003261	8/9/2010
VP	vp80410_6	2352956	1242739	0	0.110925	0.001628	8/9/2010
VP	vp80410_6	2352779	1242764	0	0.016014	0.001392	8/9/2010
VP	vp80410_6	2352583	1242731	0	0.01725	0.001632	8/9/2010
VP	vp80410_6	2352566	1242934	0.060672	0.045329	0.00186	8/9/2010
VP	vp80410_6	2352758	1242960	0	0.23555	0.001853	8/9/2010
VP	vp80410_6	2352962	1242947	0.079114	0.079346	0.00232	8/9/2010
VP	vp80410_6	2352989	1243148	0.098834	0.131239	0.000694	8/9/2010
VP	vp80410_6	2352963	1243349	0.070827	0.553193	0.00162	8/9/2010
VP	vp80410_6	2352944	1243581	0	0.120406	0.003229	8/9/2010
VP	vp80410_6	2352774	1243560	0	0.849029	0.003676	8/9/2010
VP	vp80410_7	2352760	1243345	0.465832	0.22935	0.00092	8/9/2010
VP	vp80410_7	2352773	1243162	0	0	0.000461	8/9/2010
VP	vp80410_7	2352576	1243153	0	2.368127	0.00069	8/9/2010
VP	vp80410_7	2352566	1243350	0	0.09623	0.001837	8/9/2010
VP	vp80410_7	2352566	1243575	0	0.046103	0.000228	8/9/2010

APPENDIX C

VOLUMETRIC FLUX CALCULATIONS

Grid Volume Computations

Fri Oct 08 12:23:02 2010

Upper Surface

Grid File Name:	P:\LaPlata\2010 Detailed Seep Mapping\SURFER\AW_CO2.grd
Grid Size:	19 rows x 26 columns
X Minimum:	2319800
X Maximum:	2320100
X Spacing:	12
Y Minimum:	1219800
Y Maximum:	1220010
Y Spacing:	11.666666666667
Z Minimum:	0.00071029317075931
Z Maximum:	0.27842620125357

Lower Surface

Level Surface defined by Z = 0

Volumes

Z Scale Factor:	0.0929

Total Volumes by:

Trapezoidal Rule:	666.1190350053
Simpson's Rule:	666.54435894752
Simpson's 3/8 Rule:	667.33209178529

Cut & Fill Volumes

Positive Volume [Cut]:	666.1190350053
Negative Volume [Fill]:	0
Net Volume [Cut-Fill]:	666.1190350053

Areas

Planar Areas

Positive Planar Area [Cut]:	53270
Negative Planar Area [Fill]:	0

Blanked Planar Area:	9730
Total Planar Area:	63000

Surface Areas

Positive Surface Area [Cut]:	53270.001093844
Negative Surface Area [Fill]:	0

Grid Volume Computations

Fri Nov 19 10:28:23 2010

Upper Surface

Grid File Name:	P:\LaPlata\2010 Detailed Seep Mapping\SURFER\BA_CH4notail.grd
Grid Size:	27 rows x 30 columns
X Minimum:	2330607.697
X Maximum:	2330959.443
X Spacing:	12.129172413787
Y Minimum:	1230540.384
Y Maximum:	1230856.69
Y Spacing:	12.16561538461
Z Minimum:	0
Z Maximum:	0

Lower Surface

Level Surface defined by Z = 0

Volumes

Z Scale Factor:	0.0929

Total Volumes by:

Trapezoidal Rule:	0
Simpson's Rule:	0
Simpson's 3/8 Rule:	0

Cut & Fill Volumes

Positive Volume [Cut]:	0
Negative Volume [Fill]:	0
Net Volume [Cut-Fill]:	0

Areas

Planar Areas

Positive Planar Area [Cut]:	86100.586944275
Negative Planar Area [Fill]:	0

Blanked Planar Area:	25158.783331618
Total Planar Area:	111259.37027589

Surface Areas

Positive Surface Area [Cut]:	86100.586944275
Negative Surface Area [Fill]:	0

Grid Volume Computations

Fri Oct 08 12:23:45 2010

Upper Surface

Grid File Name:	P:\LaPlata\2010 Detailed Seep Mapping\SURFER\BA_CO2.grd
Grid Size:	27 rows x 30 columns
X Minimum:	2330607.697
X Maximum:	2330959.443
X Spacing:	12.129172413787
Y Minimum:	1230540.384
Y Maximum:	1230856.69
Y Spacing:	12.16561538461
Z Minimum:	0.054979138875011
Z Maximum:	0.26380037214604

Lower Surface

Level Surface defined by Z = 0

Volumes

Z Scale Factor:	0.0929

Total Volumes by:

Trapezoidal Rule:	1203.1592827014
Simpson's Rule:	1197.5309956763
Simpson's 3/8 Rule:	1206.6394667036

Cut & Fill Volumes

Positive Volume [Cut]:	1203.1592827014
Negative Volume [Fill]:	0
Net Volume [Cut-Fill]:	1203.1592827014

Areas

Planar Areas

Positive Planar Area [Cut]:	86100.586944275
Negative Planar Area [Fill]:	0

Blanked Planar Area:	25158.783331618
Total Planar Area:	111259.37027589

Surface Areas

Positive Surface Area [Cut]:	86100.58879078
Negative Surface Area [Fill]:	0

Grid Volume Computations

Fri Nov 19 10:19:11 2010

Upper Surface

Grid File Name:	P:\LaPlata\2010 Detailed Seep Mapping\SURFER\BC-CJ_CH4notail.grd
Grid Size:	145 rows x 204 columns
X Minimum:	2299587.649
X Maximum:	2313797.777
X Spacing:	70.00063054187
Y Minimum:	1208172.045
Y Maximum:	1218242.714
Y Spacing:	69.935201388889
Z Minimum:	0
Z Maximum:	7.4968728833137

Lower Surface

Level Surface defined by Z = 0

Volumes

Z Scale Factor:	0.0929

Total Volumes by:

Trapezoidal Rule:	261772.314999
Simpson's Rule:	263463.13609336
Simpson's 3/8 Rule:	260534.90951263

Cut & Fill Volumes

Positive Volume [Cut]:	261772.314999
Negative Volume [Fill]:	0
Net Volume [Cut-Fill]:	261772.314999

Areas

Planar Areas

Positive Planar Area [Cut]:	20145016.219523
Negative Planar Area [Fill]:	0

Blanked Planar Area:	122960479.3161
Total Planar Area:	143105495.53563

Surface Areas

Positive Surface Area [Cut]:	20145019.620818
Negative Surface Area [Fill]:	0

Grid Volume Computations

Fri Oct 08 12:24:50 2010

Upper Surface

Grid File Name:	P:\LaPlata\2010 Detailed Seep Mapping\SURFER\BC-CJ_CO2.grd
Grid Size:	145 rows x 204 columns
X Minimum:	2299587.649
X Maximum:	2313797.777
X Spacing:	70.00063054187
Y Minimum:	1208172.045
Y Maximum:	1218242.714
Y Spacing:	69.935201388889
Z Minimum:	-0.26666348344938
Z Maximum:	3.6215472661407

Lower Surface

Level Surface defined by Z = 0

Volumes

Z Scale Factor:	0.0929

Total Volumes by:

Trapezoidal Rule:	411020.47337684
Simpson's Rule:	411630.49981881
Simpson's 3/8 Rule:	410710.1257361

Cut & Fill Volumes

Positive Volume [Cut]:	412806.45131922
Negative Volume [Fill]:	1785.9779423786
Net Volume [Cut-Fill]:	411020.47337684

Areas

Planar Areas

Positive Planar Area [Cut]:	19340989.801427
Negative Planar Area [Fill]:	549459.99199318

Blanked Planar Area:	123215045.74221
Total Planar Area:	143105495.53563

Surface Areas

Positive Surface Area [Cut]:	19340990.372448
Negative Surface Area [Fill]:	549459.9941338

Grid Volume Computations

Fri Nov 19 10:27:21 2010

Upper Surface

Grid File Name:	P:\LaPlata\2010 Detailed Seep Mapping\SURFER\FR_CH4notail.grd
Grid Size:	27 rows x 44 columns
X Minimum:	2330395.888
X Maximum:	2333376.538
X Spacing:	69.317441860474
Y Minimum:	1234328.648
Y Maximum:	1236162.608
Y Spacing:	70.536923076922
Z Minimum:	0
Z Maximum:	30.099745497944

Lower Surface

Level Surface defined by Z = 0

Volumes

Z Scale Factor:	0.0929

Total Volumes by:

Trapezoidal Rule:	137559.02950035
Simpson's Rule:	135518.46600476
Simpson's 3/8 Rule:	137400.37574739

Cut & Fill Volumes

Positive Volume [Cut]:	137559.02950035
Negative Volume [Fill]:	0
Net Volume [Cut-Fill]:	137559.02950035

Areas

Planar Areas

Positive Planar Area [Cut]:	3987337.5570192
Negative Planar Area [Fill]:	0

Blanked Planar Area:	1479055.3169814
Total Planar Area:	5466392.8740006

Surface Areas

Positive Surface Area [Cut]:	3987347.6732941
Negative Surface Area [Fill]:	0

Grid Volume Computations

Fri Oct 08 12:25:27 2010

Upper Surface

Grid File Name:	P:\LaPlata\2010 Detailed Seep Mapping\SURFER\FR_CO2.grd
Grid Size:	56 rows x 100 columns
X Minimum:	2330395.888
X Maximum:	2333376.538
X Spacing:	30.10757575758
Y Minimum:	1234328.648
Y Maximum:	1236162.608
Y Spacing:	33.344727272727
Z Minimum:	-0.022433285166354
Z Maximum:	1.7705083016267

Lower Surface

Level Surface defined by Z = 0

Volumes

Z Scale Factor:	0.0929

Total Volumes by:

Trapezoidal Rule:	81265.714007794
Simpson's Rule:	81357.245077212
Simpson's 3/8 Rule:	81342.339618566

Cut & Fill Volumes

Positive Volume [Cut]:	81277.34317417
Negative Volume [Fill]:	11.629166376224
Net Volume [Cut-Fill]:	81265.714007794

Areas

Planar Areas

Positive Planar Area [Cut]:	4107910.8650068
Negative Planar Area [Fill]:	10205.492963847

Blanked Planar Area:	1348276.5160299
Total Planar Area:	5466392.8740006

Surface Areas

Positive Surface Area [Cut]:	4107910.9310328
Negative Surface Area [Fill]:	10205.492987354

Grid Volume Computations

Fri Oct 08 12:27:06 2010

Upper Surface

Grid File Name:	P:\LaPlata\2010 Detailed Seep Mapping\SURFER\PBN_CO2.grd
Grid Size:	29 rows x 21 columns
X Minimum:	2384447.095
X Maximum:	2384685.312
X Spacing:	11.910849999986
Y Minimum:	1236859.188
Y Maximum:	1237190.549
Y Spacing:	11.834321428573
Z Minimum:	-0.049470875238024
Z Maximum:	0.78863122967589

Lower Surface

Level Surface defined by Z = 0

Volumes

Z Scale Factor:	0.0929

Total Volumes by:

Trapezoidal Rule:	648.5366229777
Simpson's Rule:	648.90083835911
Simpson's 3/8 Rule:	648.54569565753

Cut & Fill Volumes

Positive Volume [Cut]:	648.83533208272
Negative Volume [Fill]:	0.29870910502323
Net Volume [Cut-Fill]:	648.5366229777

Areas

Planar Areas

Positive Planar Area [Cut]:	63756.722484037
Negative Planar Area [Fill]:	167.19873612345

Blanked Planar Area:	15011.902116752
Total Planar Area:	78935.823336913

Surface Areas

Positive Surface Area [Cut]:	63756.72946732
Negative Surface Area [Fill]:	167.19877736695

Grid Volume Computations

Fri Nov 19 10:31:51 2010

Upper Surface

Grid File Name:	P:\LaPlata\2010 Detailed Seep Mapping\SURFER\TC-PR_CH4notail.grd
Grid Size:	106 rows x 281 columns
X Minimum:	2370348.256
X Maximum:	2389946.757
X Spacing:	69.994646428572
Y Minimum:	1237363.379
Y Maximum:	1244726.276
Y Spacing:	70.12282857143
Z Minimum:	0
Z Maximum:	67.759073848022

Lower Surface

Level Surface defined by Z = 0

Volumes

Z Scale Factor:	0.0929

Total Volumes by:

Trapezoidal Rule:	1166756.2596861
Simpson's Rule:	1134160.4842288
Simpson's 3/8 Rule:	1142629.9610667

Cut & Fill Volumes

Positive Volume [Cut]:	1166756.2596861
Negative Volume [Fill]:	0
Net Volume [Cut-Fill]:	1166756.2596861

Areas

Planar Areas

Positive Planar Area [Cut]:	21473473.841875
Negative Planar Area [Fill]:	0

Blanked Planar Area:	122828270.37553
Total Planar Area:	144301744.2174

Surface Areas

Positive Surface Area [Cut]:	21473646.98476
Negative Surface Area [Fill]:	0

Grid Volume Computations

Fri Oct 08 12:26:22 2010

Upper Surface

Grid File Name:	P:\LaPlata\2010 Detailed Seep Mapping\SURFER\TC-PR_CO2.grd
Grid Size:	106 rows x 281 columns
X Minimum:	2370348.256
X Maximum:	2389946.757
X Spacing:	69.994646428572
Y Minimum:	1237363.379
Y Maximum:	1244726.276
Y Spacing:	70.12282857143
Z Minimum:	-0.2369156022518
Z Maximum:	3.3209652591935

Lower Surface

Level Surface defined by Z = 0

Volumes

Z Scale Factor:	0.0929

Total Volumes by:

Trapezoidal Rule:	489343.86000852
Simpson's Rule:	487233.42571837
Simpson's 3/8 Rule:	489499.42460713

Cut & Fill Volumes

Positive Volume [Cut]:	492023.61744792
Negative Volume [Fill]:	2679.7574394042
Net Volume [Cut-Fill]:	489343.86000852

Areas

Planar Areas

Positive Planar Area [Cut]:	20912543.582501
Negative Planar Area [Fill]:	560930.25937442

Blanked Planar Area:	122828270.37553
Total Planar Area:	144301744.2174

Surface Areas

Positive Surface Area [Cut]:	20912544.348595
Negative Surface Area [Fill]:	560930.26216547

Grid Volume Computations

Fri Nov 19 10:30:50 2010

Upper Surface

Grid File Name:	P:\LaPlata\2010 Detailed Seep Mapping\SURFER\VP_CH4notail.grd
Grid Size:	30 rows x 67 columns
X Minimum:	2348581.238
X Maximum:	2353189.357
X Spacing:	69.819984848484
Y Minimum:	1242336.564
Y Maximum:	1244350.957
Y Spacing:	69.461827586204
Z Minimum:	0
Z Maximum:	0.37379877378283

Lower Surface

Level Surface defined by Z = 0

Volumes

Z Scale Factor:	0.0929

Total Volumes by:

Trapezoidal Rule:	905.32278379578
Simpson's Rule:	906.66448418381
Simpson's 3/8 Rule:	815.86139515639

Cut & Fill Volumes

Positive Volume [Cut]:	905.32278379578
Negative Volume [Fill]:	0
Net Volume [Cut-Fill]:	905.32278379578

Areas

Planar Areas

Positive Planar Area [Cut]:	4728578.1558764
Negative Planar Area [Fill]:	0

Blanked Planar Area:	4553984.5008902
Total Planar Area:	9282562.6567665

Surface Areas

Positive Surface Area [Cut]:	4728578.1597519
Negative Surface Area [Fill]:	0

Grid Volume Computations

Fri Oct 08 12:25:45 2010

Upper Surface

Grid File Name:	P:\LaPlata\2010 Detailed Seep Mapping\SURFER\VP_CO2.grd
Grid Size:	30 rows x 67 columns
X Minimum:	2348581.238
X Maximum:	2353189.357
X Spacing:	69.819984848484
Y Minimum:	1242336.564
Y Maximum:	1244350.957
Y Spacing:	69.461827586204
Z Minimum:	-0.028687570316759
Z Maximum:	2.0755476233486

Lower Surface

Level Surface defined by Z = 0

Volumes

Z Scale Factor:	0.0929

Total Volumes by:

Trapezoidal Rule:	118872.55867952
Simpson's Rule:	118803.2669487
Simpson's 3/8 Rule:	118411.4264738

Cut & Fill Volumes

Positive Volume [Cut]:	118883.54856921
Negative Volume [Fill]:	10.98988969496
Net Volume [Cut-Fill]:	118872.55867952

Areas

Planar Areas

Positive Planar Area [Cut]:	4707893.3131401
Negative Planar Area [Fill]:	20684.84273623

Blanked Planar Area:	4553984.5008902
Total Planar Area:	9282562.6567665

Surface Areas

Positive Surface Area [Cut]:	4707893.3899361
Negative Surface Area [Fill]:	20684.842849994

APPENDIX D

NATURAL SPRINGS ANALYTICAL RESULTS

PARAMETER	Alkalinity, Total	Bicarbonate	Carbonate	Hydroxide	Bromide	Calcium	Chloride	Conductivity	Fluoride	H2 S	Iron	Magnesium	Manganese	Nitrate/Nitrite as N	pH	Potassium
Darwin Rather 2	123	119	<10	<10	<0.10	37.9	<10	267	<0.2	<0.05	2.61	6.5	0.319	0.02	8.11	1.3
Darwin Rather 1	204	204	<10	<10	0.34	59.9	<10	496	<0.2	<0.05	<0.05	19.6	0.0014	1.06	7.20	1.3
Ranch Durango North	252	252	<10	<10	0.42	83.4	<10	627	0.3	<0.05	0.26	19.8	0.0093	0.65	7.30	1.1
Ranch Durango LTD	250	250	<10	<10	0.29	80.3	<10	585	0.3	<0.05	4.18	18.7	0.0863	0.16	7.32	1.4

Selenium	Sodium	Sulfate	Sulfide	TDS	Hardness	CAB
<0.001	11.8	12	<0.05	140	121	12.42**
<0.001	8.4	44	<0.05	245	230	5.52
0.002	16.8	80	<0.05	340	290	5.47
<0.001	16.9	69	<0.05	350	278	7.37

GAL ID No.: 1006-162

July 21, 2010

LT Environmental
2535 Main Avenue
Durango, CO 81301
Attention: Travis Laverty

Project Name: MS 1011
Project Number:
Date Received: 06/29/10

This is to transmit the attached analytical report. The analytical data and information contained therein was generated using specified or selected methods contained in references, such as Standard Methods for the Examination of Water and Wastewater, 18th & 19th editions, and Methods for Determination of Organic Compounds in Drinking Water, EPA-600/4-79-020.

Samples were received by Green Analytical Laboratories, Inc. in good condition on 06/29/10.

If you should have any questions or comments regarding this report, please do not hesitate to call.

Sincerely,

Jacob L. Miller
Technical Director

Enclosure

Green Analytical Laboratories, Inc.
75 Suttle Street
Durango, CO 81303

GAL I.D.: **1006-162-01**

LT Environmental
2535 Main Avenue
Durango, CO 81301
Attention: Travis Laverty

Date Received: 06/29/10
Date Reported: 07/21/10
QC Batches:

PROJECT NAME: MS 1011
PROJECT NUMBER:
SAMPLE I.D.: Ranch Durango LTD

Sample Date: 06/29/10
Sample Matrix: Water

Laboratory Report

RESULTS

PARAMETER	METHOD	REPORT LIMIT	RESULT	DIL	UNITS	Maximum Contamination Level
Alkalinity, Total	2320B	10	250	1	mg/L	
Alkalinity, Bicarbonate	2320B	10	250	1	mg/L	
Alkalinity, Carbonate	2320B	10	<10	1	mg/L	
Alkalinity, Hydroxide	2320B	10	<10	1	mg/L	
Bromide	300	0.10	0.29	1	mg/L	
Calcium	200.7	0.5	80.3	1	mg/L	
Chloride	4500CL	10	<10	1	mg/L	
Conductivity	2510B	1.0	585	1	uS/cm	
Fluoride	4500F C	0.2	0.3	1	mg/L	4.0
H2 S	Calc.	0.05	<0.05	1	mg/L	
Iron	200.7	0.05	4.18	1	mg/L	
Magnesium	200.7	0.5	18.7	1	mg/L	
Manganese	200.8	0.0005	0.0863	1	mg/L	
Nitrate/Nitrite as N	353.3	0.02	0.16	1	mg/L	
pH	150.1	NA	7.32	NA	SU	
Potassium	200.7	0.5	1.4	1	mg/L	
Selenium	200.8	0.001	<0.001	1	mg/L	0.05
Sodium	200.7	0.5	16.9	1	mg/L	
Sulfate	4500SO4	10	69	1	mg/L	
Sulfide	4500S_	0.05	<0.05	1	mg/L	
TDS	2540C	10	350	1	mg/L	
Hardness	Calc	10	278	1	mg/L	
CAB	Calc		7.37		%	

_____
Jacob L. Miller, Technical Director

Green Analytical Laboratories, Inc.
75 Suttle Street
Durango, CO 81303

GAL I.D.: **1006-162-02**

LT Environmental
2535 Main Avenue
Durango, CO 81301
Attention: Travis Laverty

Date Received: 06/29/10
Date Reported: 07/21/10
QC Batches:

PROJECT NAME: MS 1011
PROJECT NUMBER:
SAMPLE I.D.: Ranch Durango North

Sample Date: 06/29/10
Sample Matrix: Water

Laboratory Report

RESULTS

PARAMETER	METHOD	REPORT LIMIT	RESULT	DIL	UNITS	Maximum Contamination Level
Alkalinity, Total	2320B	10	252	1	mg/L	
Alkalinity, Bicarbonate	2320B	10	252	1	mg/L	
Alkalinity, Carbonate	2320B	10	<10	1	mg/L	
Alkalinity, Hydroxide	2320B	10	<10	1	mg/L	
Bromide	300	0.10	0.42	1	mg/L	
Calcium	200.7	0.5	83.4	1	mg/L	
Chloride	4500CL	10	<10	1	mg/L	
Conductivity	2510B	1.0	627	1	uS/cm	
Fluoride	4500F C	0.2	0.3	1	mg/L	4.0
H2 S	Calc.	0.05	<0.05	1	mg/L	
Iron	200.7	0.05	0.26	1	mg/L	
Magnesium	200.7	0.5	19.8	1	mg/L	
Manganese	200.8	0.0005	0.0093	1	mg/L	
Nitrate/Nitrite as N	353.3	0.02	0.65	1	mg/L	
pH	150.1	NA	7.30	NA	SU	
Potassium	200.7	0.5	1.1	1	mg/L	
Selenium	200.8	0.001	0.002	1	mg/L	0.05
Sodium	200.7	0.5	16.8	1	mg/L	
Sulfate	4500SO4	10	80	1	mg/L	
Sulfide	4500S_	0.05	<0.05	1	mg/L	
TDS	2540C	10	340	1	mg/L	
Hardness	Calc	10	290	1	mg/L	
CAB	Calc		5.47		%	

_____
Jacob L. Miller, Technical Director

Green Analytical Laboratories, Inc.
75 Suttle Street
Durango, CO 81303

GAL I.D.: **1006-162-03**

LT Environmental
2535 Main Avenue
Durango, CO 81301
Attention: Travis Laverty

Date Received: 06/29/10
Date Reported: 07/21/10
QC Batches:

PROJECT NAME: MS 1011
PROJECT NUMBER:
SAMPLE I.D.: Darwin Rather 1

Sample Date: 06/29/10
Sample Matrix: Water

Laboratory Report

RESULTS

PARAMETER	METHOD	REPORT LIMIT	RESULT	DIL	UNITS	Maximum Contamination Level
Alkalinity, Total	2320B	10	204	1	mg/L	
Alkalinity, Bicarbonate	2320B	10	204	1	mg/L	
Alkalinity, Carbonate	2320B	10	<10	1	mg/L	
Alkalinity, Hydroxide	2320B	10	<10	1	mg/L	
Bromide	300	0.10	0.34	1	mg/L	
Calcium	200.7	0.5	59.9	1	mg/L	
Chloride	4500CL	10	<10	1	mg/L	
Conductivity	2510B	1.0	496	1	uS/cm	
Fluoride	4500F C	0.2	<0.2	1	mg/L	4.0
H2 S	Calc.	0.05	<0.05	1	mg/L	
Iron	200.7	0.05	<0.05	1	mg/L	
Magnesium	200.7	0.5	19.6	1	mg/L	
Manganese	200.8	0.0005	0.0014	1	mg/L	
Nitrate/Nitrite as N	353.3	0.02	1.06	1	mg/L	
pH	150.1	NA	7.20	NA	SU	
Potassium	200.7	0.5	1.3	1	mg/L	
Selenium	200.8	0.001	<0.001	1	mg/L	0.05
Sodium	200.7	0.5	8.4	1	mg/L	
Sulfate	4500SO4	10	44	1	mg/L	
Sulfide	4500S_	0.05	<0.05	1	mg/L	
TDS	2540C	10	245	1	mg/L	
Hardness	Calc	10	230	1	mg/L	
CAB	Calc		5.52		%	

_____
Jacob L. Miller, Technical Director

Green Analytical Laboratories, Inc.
75 Suttle Street
Durango, CO 81303

GAL I.D.: **1006-162-04**

LT Environmental
2535 Main Avenue
Durango, CO 81301
Attention: Travis Laverty

Date Received: 06/29/10
Date Reported: 07/21/10
QC Batches:

PROJECT NAME: MS 1011
PROJECT NUMBER:
SAMPLE I.D.: Darwin Rather 2

Sample Date: 06/29/10
Sample Matrix: Water

Laboratory Report

RESULTS

PARAMETER	METHOD	REPORT LIMIT	RESULT	DIL	UNITS	Maximum Contamination Level
Alkalinity, Total	2320B	10	123	1	mg/L	
Alkalinity, Bicarbonate	2320B	10	119	1	mg/L	
Alkalinity, Carbonate	2320B	10	<10	1	mg/L	
Alkalinity, Hydroxide	2320B	10	<10	1	mg/L	
Bromide	300	0.10	<0.10	1	mg/L	
Calcium	200.7	0.5	37.9	1	mg/L	
Chloride	4500CL	10	<10	1	mg/L	
Conductivity	2510B	1.0	267	1	uS/cm	
Fluoride	4500F C	0.2	<0.2	1	mg/L	4.0
H2 S	Calc.	0.05	<0.05	1	mg/L	
Iron	200.7	0.05	2.61	1	mg/L	
Magnesium	200.7	0.5	6.5	1	mg/L	
Manganese	200.8	0.0005	0.319	1	mg/L	
Nitrate/Nitrite as N	353.3	0.02	0.02	1	mg/L	
pH	150.1	NA	8.11	NA	SU	
Potassium	200.7	0.5	1.3	1	mg/L	
Selenium	200.8	0.001	<0.001	1	mg/L	0.05
Sodium	200.7	0.5	11.8	1	mg/L	
Sulfate	4500SO4	10	12	1	mg/L	
Sulfide	4500S_	0.05	<0.05	1	mg/L	
TDS	2540C	10	140	1	mg/L	
Hardness	Calc	10	121	1	mg/L	
CAB	Calc		12.42**		%	

** Alkalinity and Cations rerun due to the cation/ anion balance being greater than ten. Statistically similar results were obtained upon reruns.

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Jacob L. Miller, Technical Director

PARAMETER	Alkalinity, Total	Bicarbonate	Carbonate	Hydroxide	Bromide	Calcium	Chloride	Conductivity	Fluoride	H2 S	Iron	Magnesium	Manganese	Nitrate/Nitrite as N	pH	Potassium
Darwin Rather 2	123	119	<10	<10	<0.10	37.9	<10	267	<0.2	<0.05	2.61	6.5	0.319	0.02	8.11	1.3
Darwin Rather 1	204	204	<10	<10	0.34	59.9	<10	496	<0.2	<0.05	<0.05	19.6	0.0014	1.06	7.20	1.3
Ranch Durango North	252	252	<10	<10	0.42	83.4	<10	627	0.3	<0.05	0.26	19.8	0.0093	0.65	7.30	1.1
Ranch Durango LTD	250	250	<10	<10	0.29	80.3	<10	585	0.3	<0.05	4.18	18.7	0.0863	0.16	7.32	1.4

Selenium	Sodium	Sulfate	Sulfide	TDS	Hardness	CAB
<0.001	11.8	12	<0.05	140	121	12.42**
<0.001	8.4	44	<0.05	245	230	5.52
0.002	16.8	80	<0.05	340	290	5.47
<0.001	16.9	69	<0.05	350	278	7.37

Methane Analysis Report

Four Corners Geoscience,Inc.
P.O. Box 4224
Durango, CO 81302

Client
L T Environmental,Inc.
15 West Mill Street
Bayfield,CO 81122
Mark Yalom
970-884-5215

Project Name: La Plata Spring Sampling
Project Numbe MSO813
Report Date: 10/22/2008
Sampled By: Lindsay Voss

Analysis: Brant Landers **Results:**

FCGeo #	Sample Date	Sample Time (Hrs)	Site ID-Location	CH4 (mg/L)	Limit (mg/L)	C2
101508-LB1	10/15/2008	11:15	Ranch Durango East	<0.02	0.02	ND
101508-LB2	10/15/2008	11:30	Ranch Durango North	<0.02	0.02	ND
101508-LB3	10/15/2008	12:10	Ranch Durango LTD	<0.02	0.02	ND
101508-LB4	10/15/2008	14:15	Darwin Rather #1	<0.02	0.02	ND
101508-LB5	10/15/2008	15:00	Darwin Rather #2	<0.02	0.02	ND
101508-LB6	10/15/2008	17:00	Hoier Spring	<0.02	0.02	ND

Notes:
Samples delivered to FCGeo 12:00 p.m. 10/17/08
Analyses were conducted on SRI gas chromatograph w/ FID within 24 hours of delivery.
Conducted Methane analysis per protocol and method established
by BLM San Juan Resource Area 1993 and USGS method.
Laboratory calibration quality control conducted the same day as sample runs.
Blanks and duplicated runs conducted for each sample set.
No field blanks received at FCGeo Lab
ND- Non Detected

Lynn M. Fechter, B.S. Geology

Four Corners Geoscience,Inc.
P.O. Box 4224
Durango, CO 81302

Methane Analysis Report

Client
L T Environmental,Inc.
2243 Main Avenue Suite 3
Durango,CO 80301
Travis Laverty
970-385-1096

Date Of Report
7/5/2010

Project Name: UNKNOWN
Project Number: MS 1011
Report Date: 10/10/2009
Sampled By: Travis Laverty

Analysis: Lynn Fechter

FCGeo #	**Sample Date**	**Sample Time (Hrs)**	**Site ID-Location**	**Results: *CH4 (mg/L)***	***Limit (mg/L)***
062910-LB1	6/29/2010	1000	Rancho Durango LTD	0.1	0.02
062910-LB2	6/29/2010	1025	Rancho Durango North	<0.02	0.02
062910-LB3	6/29/2010	1130	Darwin Rather #1	<0.02	0.02
062910-LB4	6/29/2010	1200	Darwin Rahter #2	<0.02	0.02
062910-Blank 1	6/29/2010	1624	Lab blank	<0.02	0.02
062910-Blank 2	6/29/2010	1703	Lab blank	<0.02	0.02
062910-Blank 3	6/29/2010	1724	Lab blank	<0.02	0.02
062910-Blank 4	6/29/2010	1733	Lab blank	<0.02	0.02

Notes:
Samples delivered to FCGeo16/29/2010
Analyses were conducted on SRI gas chromatograph w/ FID within 24 hours of delivery.
Conducted Methane analysis per protocol and method established
by BLM San Juan Resource Area 1993 and USGS method.
Laboratory calibration quality control conducted the same day as sample runs.
Blanks and duplicated runs conducted for each sample set.
No field blanks received at FCGeo Lab
ND- Non Detected

Lynn M. Fechter, B.S. Geology

Methane Analysis Report

Four Corners Geoscience,Inc.
Lynn M. Fechter, B.S. Geology
P.O. Box 4224
Durango, CO 81302

Client
L T Environmental,Inc.
15 West Mill Street
Bayfield,CO 81122
Mark Yalom
970-884-5215

Project Name: Acrchuletta Spring Sampling
Project Number: MS0814.04
Report Date: 10/22/2008
Sampled By: Mark Ebert

Analysis: Brant Landers **Results:**

FCGeo #	Sample Date	Sample Time (Hrs)	Site ID-Location	*CH4 (mg/L)*	*Limit (mg/L)*	*C2*
101808-LB1	10/18/2008	12:00	Willow Spring	<0.02	0.02	ND
101808-LB2	10/18/2008	13:00	SE John Grub	<0.02	0.02	ND
101808-LB3	10/18/2008	13:25	NW John Grub	0.03	0.02	ND
101808-LB4	10/18/2008	14:30	Section 14	0.02	0.02	ND

Notes:
Samples delivered to FCGeo 15:28:00 10/18/08
Analyses were conducted on SRI gas chromatograph w/ FID within 24 hours of delivery.
Conducted Methane analysis per protocol and method established by BLM San Juan Resource Area 1993 and USGS method.
Laboratory calibration quality control conducted the same day as sample runs.
Blanks and duplicated runs conducted for each sample set.
No field blanks received at FCGeo Lab
ND- Non Detected

Lynn M. Fechter, B.S. Geology